New York State Museum Bulletin

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No. 253 ALBANY, N. Y. JULY 1924

The University of the State of New York

New York State Museum

JOHN M. CLARKE, Director

NINETEENTH REPORT OF THE DIRECTOR OF THE STATE MUSEUM AND SCIENCE DEPARTMENT

INCLUDING THE SEVENTY-SIXTH REPORT OF THE STATE MUSEUM, THE FORTY-SECOND REPORT OF THE STATE GEOLOGIST AND THE REPORT OF THE STATE PALEONTOLOGIST FOR 1923

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ALBANY
THE UNIVERSITY OF THE STATE OF NEW YORK
1924

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THE UNIVERSITY OF THE STATE OF NEW YORK

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The University of the State of New York

The State Museum, April 22, 1924

The Honorable Frank P. Graves

President of the University

SIR: I beg to submit herewith my report as Director of the State Museum for the year 1923.

Very respectfully

JOHN M. CLARKE

Director

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New York State Museum

JOHN M. CLARKE, Director

NINETEENTH REPORT OF THE DIRECTOR OF THE STATE MUSEUM AND SCIENCE DEPARTMENT

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INTRODUCTION

To the administration of this department there comes a constantly enlarging public inquiry for a full expression of the functions of the State Museum. This opportunity is therefore taken to put in form such an expression in order to make it accessible to inquirers, incorporating herein some part of the historical but more of the actual activities, adding thereto for especial notice, noteworthy progress in these during the past year.

THE STATE MUSEUM

The State Museum dates its organization from the year 1843 and its origin from the scientific materials brought together by the Natural History Survey, 1836–43. In the matter of location its early history was vacillating and incoherent. At the start its collections were put under the supervision of the Secretary of State and were assigned to such rooms in the old State Capitol as that official could find convenient. For 10 years pushed from place to place, it was rescued and stabilized by the action of Governor Clark in 1855 who effected legislation which took over and remodeled for its purposes the "Old State Hall" at the southwest corner of State and

Lodge streets, and christened it the "Geological and Agricultural Hall." Here the collections were installed on the second and third floors of the main building, the Department of Agriculture having its offices and the New York State Agricultural Society its meeting and exhibition rooms elsewhere in the building. In these quarters the Museum expanded as best it could, chiefly along the lines of geology and paleontology, until by statute its custody came under the charge of the Board of Regents. With the accession of James Hall, State Geologist and Paleontologist, to the directorship in 1866, new life was infused into the institution, especially in its geological interests, though an anomalous situation was created by the fact that Hall as Director was responsible to the Regents of the University but as State Geologist his responsibility was sometimes to the Secretary of State and at others to the Speaker of the Assembly to whom his annual reports in this capacity were addressed. Time brought the absorption of all these duties and functions within the supervision of the University where they have since remained except for a brief period from 1893–98. James Hall's chief official title and the one he most magnified was that of Paleontologist. It may be of passing interest to note that Hall's service in this capacity and that of his immediate successor, the present writer, cover today a joint term of 103 years. Since the beginning, all departments of science have naturally expanded and as the present statute defining the State Museum is very comprehensive, providing for a general museum which shall include science, history, industry, agriculture and art, efforts have been made to develop these fields so far as opportunity has afforded.

It must be understood that the statutory term "State Museum" stands for the work of scientific and other research carried on by a staff of experts, and not merely for the display of the natural resources of the State now exposed to public view in the Museum halls. It is to these research activities, of first moment in the service rendered by the institution, that attention is here especially directed.

Scientific Activities

The Geological Survey. This title and organization date back to 1836 and have never been discontinuous. The Survey exists in fact, through the appointment by the Regents of a State Geologist and State Paleontologist with a proper staff of expert associates. The labors of these experts through a long period of years have heaped up a vast storehouse of knowledge of the geological, min-

eralogical, mining and quarry interests of the State, so that it may safely be said that the State is in possession of intimate knowledge of its geological structure and mineral wealth. Several hundred publications have been issued on these fields with which the wealth and prosperity of the people are closely knit. It is doubtless true that the researches and recommendations of the geologists, based upon knowledge thus acquired, have increased the wealth of the State in vast and even prodigious amounts.

Mineral and mining industry. In spite of the fact that New York has no precious metals, no gold, silver, platinum, no copper or coal, its mineral industry is large and varied. About sixty different minerals enter into its commercial production and its raw products amount to from 50 to 60 million dollars annually. A statistical report on all mineral production is annually prepared and direct touch with all mineral producers of the State is maintained.

Geological structure map. The areal survey of the rocks and their distribution throughout the State has been carried out in great detail and the results plotted on the standard topographic map to the scale of 1 inch equals 1 mile. On so large a scale only a close and refined knowledge can be employed. In consequence of this close survey a vast number of structural problems have arisen in all parts of the State, the solution of which has led not only to an enlargement of the understanding of the foundations of the State but have added essentially to the expansion of geological science.

Geological surface map. Surface deposits lying on top of the rock foundations are as a rule very heavy and have in large measure a glacial and postglacial origin. Their study concerns the origin of our soils and has a direct bearing upon agriculture, so that the better class of farmer who develops his land intelligently is bound to be more and more interested in the derivation of his soils. The study of the distribution of the ice-laid surface materials, of those that were drained out from beneath the ice by flowing subglacial streams or by floods resulting from the breaking up of the glacial lakes, of the extensive changes in geography when in the making of much of the present soil all present streamways were flushed, scores of now empty valleys were filled and lakes both great and small everywhere abounded, brings out an understanding of a most important though actually quite recent episode in geological history.

Hydrology. Systematic work on the hydrology of this State was inaugurated by the State Museum. In 1905 it published in the form of a bulletin of 902 pages with abundant illustrations the

Hydrology of New York by George W. Rafter. This was the earliest attempt to present an orderly account of the water power of the State and the possibilities of its development.

Paleontology. This branch of geological science has, from the earliest history of the institution, absorbed paramount attention and during the past 80 years has invited and received sympathetic support from successive legislatures. Being that science which deals in the records of ancient life with which the greater portion of the rocks are crowded, it has special attributes of highest worth in unraveling the geological history of the State and in establishing the orderly succession and classification of the rock strata which are the foundation of the State. In the higher scientific values, the recovery of the true picture of past epochs, their orderly relation, the light their data cast upon the larger problems of the derivation and continuity of life, paleontology takes lead among all the sciences. The publications on this science issued from this Department have been voluminous and are accepted as of standard and essential worth.

Botany. The official study of the native flora of the State has been carried on continuously for more than a half century. It has made known not only the plants constituting the natural growth of the State but has thrown vast light upon their habits, their adaptability to human uses, besides bringing to scientific knowledge thousands of species of plants not before recognized. It has also investigated the diseases in the plant world caused by parasitic plant life itself. The State Botanist is the custodian of the great state herbarium which is the repository of a great collection of plants. The publications issued from this branch cover both the flowering plants, including trees and shrubs, and the flowerless plants, particularly the mushrooms. These have attained notable recognition of their worth to the State and the science.

Entomology. The insects are such an enormous army and their ravages make such serious inroads on all crops of farm, garden and forest, that their control is an important state function. To effect such control an understanding of their mode of life is essential. This is the principal business of the State Entomologist and his staff — to know these insects in all their varying phases and to ascertain their habits. The insects of New York are reckoned in thousands of species, each species presenting various forms. Many of these are noxious, many others beneficial, but all must be understood in order to grasp their relations to our own existence. Constant touch is maintained with granges, farm institutes, other societies and organizations concerned with the larger agricultural, horti-

cultural and forest interests of the people. The collections of insects in the Museum are extensive and are specially illustrative of economic functions.

Zoology. The birds, fur-bearing animals large and small, and all other animals native to this State afford the very extensive field of study which falls to the part of the Zoologist and his assistants. Bird protection is generalized in the conservation law but it can not be intelligently carried out without a knowledge of the birds themselves. To acquaint the public with these natural defenders of our comfort against the encroachment of the insects, through informing publications, is a part of the function of this branch. In a similar way, each group of animals plays a part in human welfare and each member of this vast group of creatures should be represented in the Museum by its own agent. The man who knows the life history and habits of all the birds in this State can not be expected to know also the life history and habits of all the species of fish, the reptiles, mollusks, and so on down through the lower orders of animal creation. This branch, therefore, though represented by extensive collections, is seriously undermanned. Beyond any question a reasonable increase in the personnel of the zoological staff would vastly enhance the value of this service.

Archeology and Ethnology. This branch has charge of the records and artifacts of the ancient Indians as well as, in large measure, their living interests. History is often read more truly by culture relics than by documents, and the effort of the Archeologist is to bring back a picture of the unwritten but romantic days of our aborigines, especially those of that notable league, the Iroquois Confederacy. There are still nearly 6000 Indians living on reservations in this State, contacts with whom are here continuously maintained with efforts for their welfare, civic and educational. The New York State Archeological Association is an active organization of all interests in our aboriginal history, and this society has grown out of the activities of this branch. The Archeologist is in constant contact, often in a guiding capacity, with legislative and civic concerns relating to the Indian tribes. The collections representing the culture, habits and government of our aborigines are very large and valuable.

The Museum

The exhibition halls of the State Museum display, so far as they permit, the natural resources of the State, especially as exemplified by the work of the scientific staff. The collections set forth with the best effects obtainable, illustrations of the mineral, geologi-

cal and paleontological resources, and the bird, animal and insect life of the State. It is the constant resort of multitudes of lovers of nature, visitors from all parts of this State and Nation and other nations. Every effort has been made to produce attractive exhibits and many notable effects have been attained. As an educational agent the Museum is of highest value.

Scientific Reservations

Extramural exhibits of the Museum are represented by several small parks which have been presented to it for the sake of preserving from encroachment areas specially notable for their scientific or ethnological interest. These have, with a possible exception, been gifts to the State from private citizens personally interested in the purposes of the Museum. They are at the present time:

1 Cryptozoon Ledge or Lester Park, near Saratoga Springs
2 Stark's Knob Volcano, near Schuylerville
3 Clark Reservation, near Jamesville
4 Squaw Island, Canandaigua lake
5 Chittenango Falls Park
6 Flint Mine Hill, near West Coxsackie

Summary of Activities

Amphibians, study of
Aquatic insects, investigation of
Arbor Day
Archeology
Bird Day
Birds, investigation of habits, distribution and economy
Bird protection
Botany
Camp insects, control of
Clay production
Crops, protection from insects
Disease, relation of insects and plants to
Entomology, faunal studies
Ethnology
Field crop insects
Fishes, study of habits, distribution and food
Flora, study of
Forest insects, control of
Fossils, collection and study of
Fruit insects, investigation of
Fungicides, use of
Garden and field insects, control of
Gas (natural) production
Geographic names
Geological maps
Geological survey
Household insects, control of
Hydrology
Indians, history and customs
Indians, social and civic welfare
Industrial geology
Insecticides, use and supervision of
Insects, control of noxious

Insects, study of all forms of
Lectures
Mammals, investigation of habits and economy
Maps, geological
Metal mining
Mineral production
Mineralogy
Mines and mining
Mosquito control
Museum administration and technic
Mushrooms, collection and study of
Natural monuments
Oil production
Ornithology
Paleobotany
Paleontology
Pharmaceutical plants
Place names
Plant diseases
Publications
Quarry products
Reptiles, study of
Spiders, investigations upon
Water insects
Zoology; collection, preparation and investigation of all forms of animal life in the State.

THE NEW YORK STATE MUSEUM ASSOCIATION

The New York State Museum Association was organized in 1910 and has been revived this year. The object of the association is to bring into closer relationship with the State Museum all citizens of New York State who are interested in such scientific and other subjects as are included within the scope of this Museum. Membership carries no personal obligation.

The service which this association undertakes to render through its staff of scientific experts is to give information to all interested in the subjects which are enumerated on the preceding pages and to suggest courses of reading or study in these lines. To those who are making collections in natural history, information as to procedure and as to the location of suitable sites for such collecting will readily be given.

Museum Reservations

Provision for the improvement of the parks in the State under the legislation of last year enabled the expenditure of funds for very necessary repairs and betterments at the Clark Reservation, Squaw Island Reservation, Stark's Knob Reservation and the Lester Park Reservation. In carrying out these betterments the Director has had the cordial and generous cooperation of the Commissioner of Conservation.

Under still more recent legislation the Director of the Museum becomes a member of the State Council of Parks.

Cooperation

The Museum cooperates with various official agencies whose work requires technical information in educational, scientific or administrative lines, or with which it works in a partnership relation for the accomplishment of some definite end. Some of these activities are noted here:

1 The United States Geological Survey and the Bureau of the Census in gathering and compiling statistics relating to the mining and quarry industry

2 The National Research Council in the solution of problems in paleontology

3 The Conservation Commission and the United States Bureau of Agriculture in the control of the gipsy and brown tail moths

4 The Conservation Commission in the enforcement of the conservation law as it concerns the birds, mammals and fishes of the State

5 The State College of Agriculture and the Agricultural Experiment Station at Geneva in the study and control of noxious insects

6 The State Department of Farms and Markets in the control of fruit and vegetable insects and the enforcement of quarantine laws

7 The National conferences on state parks

8 Official conferences on the welfare of the national parks

9 The State Indian Commission in its educational and administrative work bearing upon the interests of the Indians of the Commonwealth

10 The United States Indian Commissioners and the Federal Commission of One Hundred on Indian Affairs

11 The State Farm Bureau organizations in work upon insect and plant disease control

12 The Public schools of the State in the preparation and distribution of publications relating to the animal and plant life of the State

Proposed New Museum Building

Not long after the State Museum had occupied its present quarters in the Education Building, it became quite evident that the space allotted for it would not be adequate for the science museum alone, and by 1916 the Director had designed a plan for a new and independent museum building, going so far as to secure from the administration of the city of Albany the allotment of a site for this suggested building. The plan was purely an expression of the needs of the institution without any substantial hope of realization

at that time, but on the occasion of the rededication of the State Museum in 1916, when Colonel Theodore Roosevelt delivered the principal address of the program, the building was brought to his notice as an expression of the realization of the museum as outlined in the statute of the State. With the creation of the Roosevelt State Memorial Commission in 1920, this plan or the idea and the necessity which it embodied, was brought before the commission and accepted by them eventually as an alternative proposition for their consideration and approval, the other being a plan to erect a cenotaph hall of great magnitude as a part of the façade of the American Museum of Natural History in New York City. The merits of the two proposals were studied with infinite care by the commission, and on a final vote this commission of six members was divided 3 to 3, so that it became necessary to report to the Legislature the findings of the commission in that form. In consequence of this situation, bills were introduced in both houses of the Legislature of 1924, providing for each of the plans; that of the State capital city and that of New York City. While the debate upon the merits of these claims has not at this time been determined, the effort on behalf of the Museum authorities to interest the public in the welfare of the State Museum has been most productive of expressed concern from all over the State and has thus resulted in more widespread knowledge of the State Museum, its statutory claims and its actual functions and activities. A new outlook which carries favorable intimations for the welfare of the State Museum is presented by the recommendations of Governor Alfred E. Smith for additional buildings to meet the requirements of the enlarged administration of state business. The appointment of a commission to make recommendations in this matter should naturally lead to the inclusion of the Museum within the plans of this building project.

Committee on Geographic Names

The Legislature of 1922–23 repealed the law creating the State Board of Geographic Names. This board was created by statute in 1913 with the Commissioner of Education as ex officio chairman, Director of the Museum as Secretary and Executive Officer, and with three members appointed by the Governor. It never drew an appropriation, never cost the State a cent, but during its existence accomplished no little good work in regulating the introduction of new place names and in compiling and explicating the existing names. Its reports were printed on occasion with the annual reports of the

Museum. The reason for the repeal of the law creating this board was chiefly the fact that it had no dependence on or connection with any other department of government and it was the expressed feeling of legislators and the Governor that this work should be carried on under the auspices of The University of the State of New York. Therefore, when this repeal became effective, the Regents of the University replaced the old board with a Committee on Geographic Names, without qualification of the functions of the board, this committee taking the following personal composition: As representatives of the Board of Regents, Messrs Charles B. Alexander, Herbert L. Bridgman and Walter Guest Kellogg; as active members, the Director of the Museum as chairman, Dr James Sullivan, Dr A. C. Flick, A. J. F. van Laer, Arthur C. Parker and H. C. Wardell. Since its organization, the committee has been called upon to adjudge a number of applications for changes of names, introduction of new names, etc. and these will be summarized in a future report.

The old board in the course of its existence prepared and printed in the Director's Report for the year 1913 (New York State Museum Bulletin 173, pp. 44–48), detailed lists with historical explanations and definitions of all the place names in Albany, Rensselaer and Schenectady counties, and in accordance with the purpose of the present committee to continue this explication of the remaining place names of the State, there is presented on a later page a glossary of the place names of Ontario county.

GEOLOGICAL SURVEY

The areal geological survey of the State has been continued in the Adirondack region by the completion of the Gloversville quadrangle. Progress in this difficult region is slow but the Adirondacks have now been geologically surveyed on the scale of 1 mile to the inch for nearly one-half their extent.

During the present season special attention was given by Professor W. J. Miller to the geological structure of the Thirteenth lake quadrangle in the south-central region of the Adirondacks. It is an area of special interest and presents many problems difficult of resolution. A large part of the foundation rocks are the primitive Grenville limestone and its allies, which represent the oldest sedimentary formation of which there is any knowledge. This has been broken through by extensive developments of deep-seated igneous rocks which cover many square miles and seem to be entirely separate from the igneous masses farther to the east in Essex and Franklin counties. These deep-seated rocks are cut across by numerous injections of granite which indicate that the former was sufficiently consolidated to fracture when the granite was injected. Garnet-bearing rocks are widely distributed throughout this region, and the evidence strongly indicates that the garnet rocks of the Barton mine on Gore mountain and the Hooper mine near Thirteenth lake were formed by some kind of interaction along the contacts of unlike masses of igneous rocks. The Sacandaga river from Oregon south, follows a line of faulting and the topography indicates that Thirteenth lake lies in a fault depression. In southeastern New York, through the complicated Schunnemunk mountain region and its extension to the east of the Hudson river, some field work was carried on by Mr Walter J. Yeaton. It is hoped to continue the survey of this region during the coming season.

Dr Rudolf Ruedemann has continued the delineation of the geological formations in the region known as the Capital district which includes four quadrangles. In view of the growing interest in the geology of Albany and its vicinity this work, when completed, will be an important guide to students of science.

AN ATTEMPT TO DETERMINE THE ORIGIN OF THE GLACIAL MORAINES FROM A STUDY OF GLACIAL BOULDERS

If a boulder buried in a moraine or left standing alone as a result of outwash, can be identified by its mineral structure, its general petrological character, or if it should contain fossils with any known outcrop of rocklike character, a clue is at once afforded to the direction and distance through which this boulder has moved. It happens frequently in the study of such boulders from the fossiliferous rocks, that the fossil contents afford evidence of the approximate origin of the transported block. What is true of morainic boulders is equally true of outwashed gravel from deposits of till. But in a state like New York where the fossiliferous outcrops run for the most part in an east and west direction, except as they bend south and southeastward along the Hudson valley, such clues as the fossils afford are not very exact, in view of the fact that the sedimentary strata may hold their lithological and fossil characters over long distances. As a striking illustration of this fact we may cite the fossil-bearing pebble beds from about Fort George, New York City. These are full of paleozoic fossils which have evidently come from the north and northwest, but from just what points they have been derived or how far they have been transported is still a matter of uncertainty.

Identity of petrographical structure in crystalline or igneous rocks seems to be of somewhat more reliable character and Dr A. C. Gill of Cornell University has interested himself in the effort to establish the identity of such crystalline boulders with their parent ledges, basing his observation on the test of intimate microscopic petrology. It is probably true that in a country like this, whose rock outcrops have been extensively ground down and quite as extensively buried by glacial débris and soil, the chances for such positive identifications must always remain remote and must depend in large degree upon the identification being founded on a rock mixture of unusual character. Doctor Gill has, however, gone far enough to bring out in certain cases a very definite probability in favor of far-traveled glacial blocks whose place of origin can be located with some degree of reliance.

These are very suggestive operations and in order to test out this procedure more fully, a field effort has been made to assemble additional data that may eventually lead to further identifications of this kind. In selecting certain areas in the eastern part of the State,

boulder deposits have been examined along predetermined lines extending westward from Rensselaer county, through Saratoga, Schenectady and Montgomery counties, and from Altamont southwest and west through Albany, Schoharie, Otsego, Chenango and Madison counties. Further examination has been made of the St Lawrence river lowland near Ogdensburg and Clayton. Specimens of these crystalline boulders were collected for thorough petrological examination in the hope that some of them may lead to a definite correlation with the parent rock.

A larger part than is generally thought, of the morainic material and outwashed gravels of our glacial deposits is of local origin; that is, it has not been transported far. By way of illustration, of the coarse gravels which are deposited in what is known as the Van Rensselaer sand bank north of Albany, which are outwash or esker deposits, more than 80 per cent by actual test, show that the ice and water movements have carried them for but a relatively short distance, not far from the confines of the mass of sandstone and shale which makes up a large part of the northern Hudson and eastern Mohawk valleys. Crystalline boulders, however, have better resisted wear and have therefore been able to travel farther, and these far-travelled boulders are those which for the most part constitute the large glacial rocks scattered over the State. During this season's operations in this field the actual work has been done by Mr James H. C. Martens.

PALEONTOLOGY

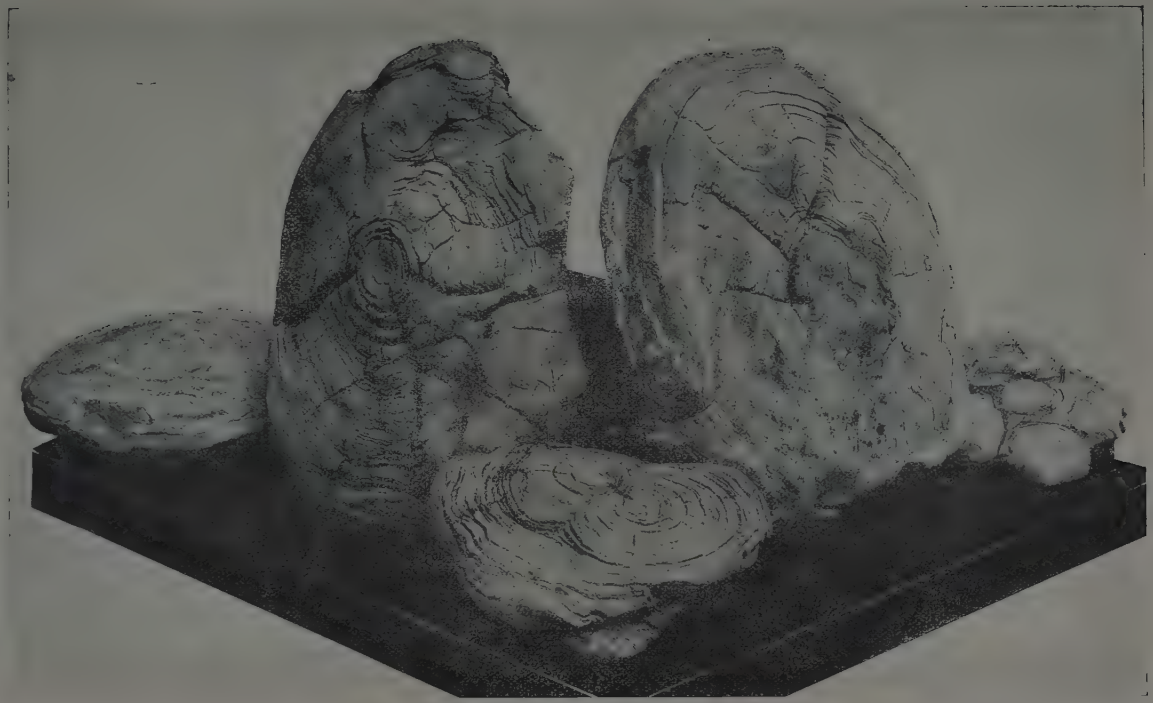
The Gilboa Devonian Forest. The analytical study and reconstruction of these trees have been so far completed that it has been possible to inaugurate the restoration of this forest intended for exhibition on the floor of the Museum. The plan of this restoration is to represent the three successive levels in the rock in which the tree stumps have been found, with the actual stumps in place and in the background to portray a conception of the growing forest in which the trees were rooted. The work is going forward under the direction of Henri Marchand who is aided by his sons, Paul and Georges Marchand.

Fauna of the Bertie waterlime and Lockport limestones. These impure limestones were laid down under physical conditions that are not repeated in the succession of the New York formations, and the animal life of these impure and shallow seas is of a very interesting character though the fossils themselves, except for the eurypteris, are not striking or often well preserved. The collection of them requires great patience and perseverance but the accumulations of later years have brought into the Museum a quite extraordinary addition to the known faunas of these geological horizons. Very many of these interesting additions have been collected by Mr E. Reinhard of Buffalo and their characteristics have been developed by Doctor Ruedemann.

Graptolites. Doctor Ruedemann is engaged in the preparation of a monograph of the North American Graptolites and for the purposes of preparation has received very extensive collections from all parts of the country, especially the complicated mountain regions of Western America, Idaho, British Columbia and Alaska, as well as the collections which have been accumulating in the National Museum at Washington. This work has received the support of the National Research Council which has enabled Doctor Ruedemann to purchase some expensive but necessary apparatus, notably a Lapworth-Parks microscope for drawing.

Stratigraphy of the Utica and Lorraine formations. The completion of this work by Doctor Ruedemann is the outcome of several years of labor and contributes a vast fund of knowledge to the understanding of these Lower Silurian formations in New York. The first part of this bulletin has been submitted for printing.

The Cryptozoon reefs near Saratoga. Frequent reference has been made in previous reports to the occurrence of these very an-



Entire specimens of Cryptozoon proliferum from new exposures at Ritchie park near Saratoga Springs. The large examples measure 2½ feet in diameter.

cient reefs believed to have been made by the natural growth processes of lime-secreting algae. The State Museum has for several years controlled the now well-known Cryptozoon Park to which reference is made elsewhere. It is of special interest to record, in connection with this park, the very notable further exposures of these reefs which have been laid open by Messrs John and Robert Ritchie of Saratoga Springs. These gentlemen, prompted by a high impulse for the public interest, have acquired a considerable acreage nearby which is admirably adapted for park purposes and the surface of which is dotted with exposures of these Cryptozoon reefs. The Ritchie property is not a continuous floor of rock, but is softened and beautified by an undulating grass cover, with clusters and clumps of trees and shrubs so placed that the whole area could be, with very little expenditure, made a most attractive spot to the traveling public.

INDUSTRIAL GEOLOGY

Oil survey. In the report of last year considerable information was given relative to the oil survey being carried on in southwestern New York. During the past season this work has been continued and completed.

The geological field work was carried on by William L. Russell of New Haven, Conn., and the necessary instrument work by T. C. Major of Wellsville, N. Y. The notes and maps submitted by the field workers are now being used in preparing a report on the New York oil fields.

This survey was primarily concerned with problems relating to new processes for increasing the recovery of oil from the oil sands through methods of restored pressure. Restored pressure takes the place of, or acts as a substitute for, natural gas when the latter becomes exhausted to such a degree that it is no longer able to drive oil through the sand. The artificial pressures used to take the place of natural gas are either water or air, or natural gas itself, any one of which may be introduced into a well, and made to serve as a motive force to propel the oil through the sand to another well or wells from which it can be pumped. When air or gas is used it must be put under pressure, but with water, the hydrostatic pressures are derived from the column of water in the well. Much information concerning these new methods of extracting oil has been obtained, and field studies have resulted in throwing much additional light on the structural relations of the oil sands.

New York State has already produced 70,000,000 barrels of oil since the fields first attained commercial importance about 1878, at which time 250 wells were producing. The maximum annual production was in the early eighties with the opening of the Allegany county field with a production for the State of over 5,000,000 barrels annually. In 1888 the annual production had fallen below 2,000,000 barrels and in 1911 it was below 1,000,000 barrels. With the use of flooding, the annual yield of oil is again increasing and the 1922 production was once more to the 1,000,000 barrel mark.

Natural gas. Natural gas has been produced in New York State on a commercial basis for more than 100 years. At the present time some 1600 wells are producing outside of the oil regions of Allegany, Cattaraugus and Steuben counties. As a commodity natural gas has an ever increasing value both for fuel and lighting purposes. With the gradual exhaustion of the present gas pools,

there is a continued demand for new supplies in order to maintain production necessary for communities using the gas. Inquiries relating to the geological conditions under which natural gas is found and requests for information relating to drilled wells are more numerous than for any other branch in industrial geology. Within the past 2 years two pools of considerable importance have been brought in: one at Dansville, Livingston county, and the other at Arkwright, Chautauqua county. It is of interest to note that several wells in the latter pool are among the largest ever found in the State.

Many data concerning well records and geological conditions are available but scattered through our various reports. There are also unpublished data which have been obtained during recent years. These assembled and correlated would afford valuable material, which supplemented by further field studies would warrant publication as a bulletin of the State Museum. The investigation of the natural gas resources of the State is perhaps more urgent than that of any other, with the possible exception of salt.

Salt. The annual production of rock and brine salt in New York State has now reached a total of over 14,000,000 barrels annually.

Within the past year or two a new shaft for the production of rock salt has been completed at Portland Point, Cayuga county. This is the most easterly of the shafts that have been sunk to rock salt in the State. Another shaft has recently been completed by the Retsof Salt Company near the village of York, Livingston county. At present a test well, at Himrod, Yates county, put in by the diamond drill has reached the salt beds.

Frequent requests for information relating to the salt deposits in New York are received by this office. These requests we are often able to satisfy by ferreting out scattered details contained in our numerous records on oil and gas wells. Such backhanded procedure of obtaining information on salt is, however, cumbersome and many times inadequate. The salt industry merits an exhaustive study of its own, not only because of its present volume of production, but also because no special report of the industry has been made in more than 30 years.

If New York State is to retain the high place she has established for the production of salt, every encouragement is due those interested in the problem. An exhaustive report would prove of assistance to those endeavoring to establish plants ultimately under such conditions that production can be maintained economically with due regard for thickness and character of salt beds together with depth and location of shaft and transportation facilities.

Some time ago a study of the salt deposits of the State was undertaken, but unfortunately both investigators are no longer with the Department. It would seem highly important now that the work of this previous investigation be completed as soon as possible so that those desiring the information may have access to it.

At present Professor Harold L. Alling is engaged in the investigation of the agencies and distribution of our salt deposits. His report, when completed, will be of special interest in indicating the geological history of the salt and also the possibilities of further development. Such a report should doubtless be supplemented by a technical study that will make a direct appeal to the salt industry in its present refined status.

Mineral statistics. The arrangement entered into a few years ago with the United States Geological Survey for the collection of statistics showing the annual production of the natural resources of the State is being continued. Through this arrangement not only is the annual production of our mineral wealth made available, but we are enabled thereby to keep in close touch with the various new enterprises and developments taking place in the mineral industry, which leads to correspondence with many of the producing firms through which much geological information is obtained. The last comprehensive report on the mineral industry was issued in 1921. Statistics and notes on the industry since that time are being incorporated into a report including the statistics for the year 1923, which, however, are not yet complete. The high record for mineral production was in 1920 with a value of more than $78,000,000.

Molding sand. In conjunction with the American Foundrymen's Association a special restudy of the molding sands of the Hudson river district was inaugurated, the field work being carried on by Mr C. M. Nevin of Cornell University. The Albany molding sand has a wide repute and is the most familiar of any to foundrymen generally. For this reason it was regarded very proper that the first systematic investigation to be carried on under this cooperative arrangement should be in the Hudson river field. The sands are to be submitted to the newly standardized molding sand tests, together with the practical application of the result of these tests which are essentially these: permeability, cohesiveness and fineness or grain size. The publication of the results of these tests upon the Albany grades will, it is believed, form the basis for an agreement between the producers and the foundrymen as to the meaning and limits of the Albany sands.

In the judgment of Mr Nevin there seems to be considerable available molding sand of good quality still remaining although the deposits in this field have been worked for many years; in fact since the early days of the iron industry in this country. The region still to be developed seems to lie principally in the upper Hudson valley in the vicinity of Corinth and Glens Falls, and it appears now that future development will probably be in a general northerly direction.

Iron ore. With the recent issue of the report by Mr R. J. Colony on the Magnetic Iron Deposits of Southeastern New York, the description of the main iron ore areas which at present have the most important iron ore deposits has been completed. The Clinton iron ore beds of central and western New York, and the magnetic iron ore deposits of the Adirondacks have been described in bulletins already issued. The rounding out of this subject will enable this office to give fairly exhaustive information to those making inquiry regarding the main iron-producing areas in the State.

BOTANY

REPORT BY HOMER D. HOUSE, *State Botanist*

Scientific investigations. The investigative work of the State Botanist during the past year has been directed chiefly toward the completion of an annotated list of plants of the State which is now being printed. This has involved much bibliographic work as well as study of the plants in the state herbarium. Collections and field studies have been carried on in the vicinity of Newcomb, Essex county; Watertown, and the east shore of Lake Ontario, in Jefferson county, and the vicinity of Oneida lake in the central part of the State. Collections of plants from these and other localities, which are of scientific interest have been incorporated into the herbarium. The ferns and flowering plants of peculiar interest, as well as new or rare species of fungi form the basis for scientific papers which will appear in the next Annual Report of the State Botanist.

Contributions to the state herbarium. The accessions to the state herbarium during the past year in the form of contributions and exchanges are presented in the following list of contributors, which also indicates the number of specimens received from each.

I. W. Clokey, Denver, Colo. (exchange)	254
J. B. Norton, Hartsville, S. C. (exchange)	152
Dr P. O. Schallert, Winston-Salem, N. C.	116
Leland S. Slater, Coxsackie	60
Douglas M. White, Rochester	43
Dr J. J. Davis, Madison, Wis.	32
Roy Latham, Orient	17
U. S. Dep't of Agriculture, Washington, D. C.	15
Gordon T. Doe, Homestead, Fla.	10
William C. Ferguson, Hempstead	9
W. C. Muenscher, Ithaca	6
Miss Annabel Martin, Broadalbin	3
British Museum, London, England	3
W. H. Beauchamp, Syracuse	2
George E. Andrus, Middletown	2
Fra. Hubert, St Bonaventure	2
Professor John Dearness, London, Ont.	1
Charles Gilbert, Honeoye	1
Dr William Mansfield, Albany	1
Frank Dobbin, Shushan	1
W. T. Shoemaker, Elmira	1
Mrs L. F. Jolley, Berkshire, Vt.	1
Total	732

Additions to the herbarium. The number of specimens which have been added to the herbarium from all sources is 1242. Besides the 732 received in exchange or as contributions, 220 specimens were collected by the State Botanist in the counties of Albany,

Bronx, Essex, Jefferson, Lewis, Madison, Nassau, Oneida, Oswego, Rensselaer and Warren. In addition to these, 290 specimens of mosses, lichens and fungi have been collected and added to the herbarium. A large number of other specimens were taken, some of them duplicates of those reserved for the herbarium, to be used for the purpose of exchange with other institutions and botanists.

Doctor Peck's field notes. Investigators in mycology who have had occasion to refer to the late Dr Charles H. Peck's types or other collections in the state herbarium, have often commented upon the fact that his descriptions and reports of species already published do not give the year of collection. This is explained in large part by the fact that the species described or reported upon were collected during the year for which the publication is the annual report. Very rarely does he report upon any collection except of the current year, the various monographs, of course, excepted. These monographs were very largely, if not wholly, a compilation of his former published and reported species, without much reference to the considerable mass of undetermined material of those groups which was stored away in bundles. This is well illustrated by Kauffman's critical study of Peck's material of the genus Inocybe (N. Y. State Mus. Bul. 233–244: 43–60. 1921).

In his notebooks, Doctor Peck described under tentative names a very large number of fungi which his critical judgment did not permit him to publish for one reason or another. Without doubt, many of these are valid as well as unpublished species, as indicated by Murrill in the case of Stropharia campestris, and Stropharia rugoso-annulata Farlow; Peck (Mycologia 14: 136, 139. 1922). Since the notes were made almost without exception from fresh material they possess a considerable value to the later students of the groups represented. In addition to his notes upon many well-known as well as little-known species made from fresh material, and never published, which are now available for consultation, the descriptions of his unpublished species will prove of value and assistance to future investigations.

In order that these voluminous notes, occupying some thirty notebooks, may be available for reference, an index has been prepared which has been typed with carbon copies. One of these carbon copies has been placed in the Office of the Pathological Collections at Washington, and the other in the mycological laboratory of the New York Botanical Garden. From the original copy, Dr Howard

A. Kelly of Baltimore has had additional copies made for his own mycological laboratory, and for the mycological laboratories of Harvard University and the Missouri Botanical Garden. Investigators working at Albany may have reference to these notes. Those working at a distance, or from consultation with the copies elsewhere, may secure upon application a transcript of such items as are desired. Unless the material to which the notes refer is quite ample, however, it is a rule of the New York State Museum not to lend material, especially of type specimens.

Doctor Peck's notebooks, covering a period from 1868 to 1913, are numbered from 1 to 32. The typed index to the thirty-two notebooks occupies 130 pages, and is divided into:

Personal Mention
New York Localities
Flowering Plants and Ferns
Mosses, Liverworts, Lichens and Algae.
Fungi

The last is naturally the important part of the index and occupies the pages 25 to 130 of the manuscript.

Identifications. The State Botanist's office has been called upon to identify 753 specimens of plants, including many edible and poisonous mushrooms, during the past year. These identifications were requested by 194 persons, most by mail, some of them, however, by personal visit to the office. The summary of this work by months shows that during late summer and autumn this service is in greatest demand:

January	3	July	46
February	7	August	172
March	4	September	179
April	41	October	154
May	23	November	47
June	45	December	33

The identifications made during this period represent very nearly a 200 per cent increase over the preceding year.

Visitors. The extensive collections of the state herbarium, especially rich in valuable type specimens of fungi, are frequently consulted by specialists in various lines of botanical research. The following botanists have registered in the herbarium for study of material during the past year:

Dr L. O. Overholts, Pennsylvania State College
Dr A. Gershoy, Columbia University
Dr W. A. Murrill, New York Botanical Garden

Dr K. M. Wiegand, Cornell University
Dr W. C. Coker, University of North Carolina
Dr H. M. Fitzpatrick, Cornell University
Dr C. C. Plitt, University of Maryland
Dr James R. Weir, United States Department of Agriculture
Dr G. R. Bisby, Manitoba Agricultural College
J. Andrew Drushel, Harns Teacher's College, St Louis
Lawrence Stetson, Johnstown, N. Y.
Dr H. K. Svenson, Union College
Miss Minnie W. Taylor, United States Department of Agriculture

Lectures. The State Botanist has delivered nine lectures before various organizations upon the subject of wild flower protection and other botanical subjects.

Plants new to the State. The following species of plants added to the state herbarium during the past year were not previously represented in the collections.

Hepatics

Frullania Selwyniana *Pearson*

Ferns and Fern Allies

Adiantum pedatum aleuticum *Rupr.*
Lycopodium carolinianum *L.*

Flowering Plants

Chaetochloa ambigua (*Guss.*) *Scribn. & Merr.*
Panicum auburne *Ashe*
Bromus japonicus *Thumb.*
Elymus robustus var. vestitus *Wiegand*
" striatus arkansanus (*S. & B.*) *Hitchc.*
Carex polymorpha *Muhl.*
Rynchospora pallida *M. A. Curtiss*
Ornithogalum nutans *L.*
Smilax herbacea var. latifolia *House*
Salix syrticola *Fernald*
Coriandrum sativum *L.*
Cicer arietinum *L.*
Eryum Lans *L.*
Vicia Faba *L.*
Eupatorium Torreyanum *Short*
Doellingeria umbellata var. flexicaulis *House*

Fungi

Acrospermum cuneolum *D. & H.*
Acrothecium melanoplus (*Schw.*) *Sacc.*
Asterina Killipii *Dearn. & House.*
Beloniella brevipila (*R. & D.*) *D. & H.*
Cenangium griseum *D. & H.*
Cercospora avicularis *Winter*
" omphacodes *E. & H.*
" Violae *E. & H.*
Cerotelium urticastri *Mains*
Ciboria firma (*Pers.*) *Fckl.*
Clasterosporium larviforme *Fairman*
Cladosporium subsessile *E. & B.*
Colletotrichum salmonicolor *O' Gara*
Coryneum Cydoniae *D. & H.*
Corticium tessulatum *Cooke*
Dendrodochium densipes *Sacc. & Ell.*
Dendrophoma Azaleae *D. & H.*
" Syringae *Desm.*
Diaporthe aorista *E. & E.*
Diplosporium flavidum *D. & H.*
" Polypori *D. & H.*
Dothidella caricina *D. & H.*
Exoascus Farlowii (*Sadeb.*) *Sacc.*
Gelatinosporium Ilicis *D. & H.*
Gnonomia setacea var. Caryde *D. & H.*
Guignardia Pleurothallis *D. & H.*
Helicia buccina *D. & H.*
Helminthosporium naviculatum *D. & H.*
" Phomatae *D. & H.*
Hymenochaete episphaeria (*Schw.*) *Massee*
Hymenula Phytolacae *Berk.*
Hypoderma brachyspora (*Rostr.*) *Tubeuf*
Lachnea setosa (*Nees*) *Gill.*
Leptosphaeria borealis var. Populi *D. & H.*
Leptostroma Allii *D. & H.*
" Abietis *Rostr.*
Leptostromella Mali *D. & H.*
" Angelicae *D. & H.*
Leptothyrella aceris *D. & H.*
Lophodermium Abietis *Rostr.*

Lophodermium Oxycocci var. hypophyllum *D. & H.*
Marssonina Thomasiana (*Sacc.*) *Magn.*
Macrophoma Pernettyae *D. & H.*
Macrosporium Martindalei *E. & M.*
Mycosphaerella pachyasca *Rostr.*
Ombrophila setulata *D. & H.*
Ostropa mellea *D. & H.*
Otthiella Staphylina (*E. & E.*)
Pestalozzia quadrisetulata *D. & H.*
Phacidium Populi *Lasch*
Phyllosticta Cyanococci *D. & H.*
Placosphaeria Bacchardis *D. & H.*
Plasmopara illinoiensis (*Farl.*) *Davis*
Pleosphaerulina Briosiana *Pollasci*
Pleospora herbarum var. triglochinis *D. & H.*
" scarbra *Mout.*
" vagans *Niessl.*
Poria barbaeformis (*B. & C.*) *Sacc.*
" corticola (*Fr.*) *Cooke*
" lenis (*Karst.*) *Bres.*
" papyracea *Schw.*
" nigrescens *Bres.*
" vitellina (*Schw.*) *Sacc.*
Pseudographis Phragmitis *D. & H.*
Ramularia dispar *Davis*
" fraxinea *Davis*
" repens *E. & E.*
Scopaphoma Corioli *D. & H.*
Septoria alnifolia *E. & E.*
" Commonsii *E. & E.*
" Sii *Rob. & Desm.*
Sphaerographium niveum *D. & H.*
Synchytrium pulvereum *Davis*
Teichospora Chevalierii *Karst.*
Telimena Elymi *Orton*
Tympanis Cephalanthi *D. & H.*
Urnula terrestris (*Niessl.*) *Sacc.*

ENTOMOLOGY

REPORT BY MORTIMER D. LEONARD, *Associate State Entomologist*

Although the past year has not presented any very unusual developments in connection with injurious or other insects, it has seen a rather unusual change in the personnel of the office of the State Entomologist. When money became available early last spring, through special appropriation of the Legislature, for a comprehensive and detailed study of the gipsy moth, under the supervision of the New York State Conservation Commission, Dr E. P. Felt, who has been in this office for 25 years, was selected to take charge of the technical investigations in this work.

Doctor Felt therefore applied for leave of absence with retention of title, and has been acting as chief entomologist of the New York State Conservation Commission, with headquarters in Albany. On May 1st Dr M. D. Leonard, former extension entomologist of the New York State College of Agriculture and later director of the field service division of the Bowker Chemical Company of New York City, assumed charge of the office of the State Entomologist with the title of Associate State Entomologist.

The Associate State Entomologist and the Assistant State Entomologist, Mr D. B. Young, have attempted to continue, as closely as possible, the work which the office already had under way and have made observations upon many insects, particularly those of an injurious nature, in several parts of the State. The more important of these may be briefly noted as follows:

The European corn borer (Pyrausta nubilalis Hubn.). The Associate State Entomologist was appointed, in place of Doctor Felt, as collaborator on the European corn borer with the Bureau of Entomology of the United States Department of Agriculture, and has attempted to keep in touch with developments regarding this insect, which is of such great potential importance to the corn crop of the country.

In order to obtain first hand knowledge of developments, a trip was made in the fall of 1923 to the infested area in western New York in the vicinity of Silver Creek. The United States Bureau of Entomology maintains a laboratory at this place for the study of the corn borer. Following a brief survey of conditions at Silver Creek, the writer proceeded to St Thomas, Ontario, Canada, to attend a field meeting on the corn borer, participated in by officials of the Entomological Branch of the Department of Agriculture of Canada

and entomologists of the United States Bureau of Entomology and of the state of Ohio.

In general, there has been a more or less limited extension of the infested area in New England, a slight extension in eastern New York and a fairly substantial extension, particularly to the southward, in western New York and Pennsylvania. There has been a somewhat considerable extension of infested territory along the lake shore in Ohio and also in Canada. It is worthy of note that a slight infestation was found this past season in Madison county, N. Y., and another in Brooklyn, the latter in an area situated between Prospect park and Fort Hamilton. Fortunately, the infestation has increased but little, if any, in severity during the past season over the whole territory now known to be infested but the continued spread of the pest, even in the face of active measures to prevent such an occurrence, points to the necessity of a widespread campaign for the adoption of measures which would tend to reduce to a minimum the abundance of the corn borer.

Gipsy moth (Porthetria dispar Linn.). During the past year the investigational and repressive work on this pest has been adequately provided for and handled by the Conservation Commission. Several slight infestations, which have been found as a result of careful widespread scouting along the eastern boundary of New York State, have been apparently entirely wiped out. Extension of the known western boundary of infestation in New England makes this pest a continually growing menace to the forest and woodland areas of New York State, and studies have been carried on by the Conservation Commission with a view to laying down, as soon as is practicable, the so-called "barrier zone" along the eastern boundary of the State, running from the Canadian line to Long Island sound, east of which there will be an attempt to keep the insect from spreading. Doctor Felt's observations along this whole line have thrown much light on the possibilities of preventing the eastward spread of the pest and should materially assist in directing repressive operations in the future to those points at which the chances are greatest of the gipsy moth gaining a foothold in the State.

The apple and thorn skeletonizer (Hemerophila pariana Clerck). The past year has seen a remarkable extension in the range of this European pest, and it now occurs from Orient Point on Long Island to Whitehall and as far west as Schoharie. It has also been found on the west slope of the Catskills in Greene

county and is distributed throughout the whole of Orange and Rockland counties. All of Connecticut and most of Rhode Island and Massachusetts are now infested. Many orchards have been almost entirely defoliated by the pest and although the caterpillars readily succumb to poison sprays, the insect is of no little concern to the apple orchardists within the infested area. There is every reason to believe that the coming season will show a marked increase in infested territory.

The present status of the pest in New York and neighboring states and the present most practicable suggestions on control will appear shortly in a revision of Cornell Extension Bulletin No. 27 on Apple and Thorn Skeletonizer, by E. P. Felt and M. D. Leonard.

The European snout beetle (Phyllobius oblongus Linn.). This pest has appeared for the first time in this country, as far as is known, in considerable numbers on elm trees in Highland park, Rochester. The leaves were damaged to some extent by the feeding of the beetles, but apparently the infestation was considerably localized. In England the weevils damage apple blossoms and it is said that grafted plants in nurseries are especially liable to attack. Particular note should be taken during the coming season of possible extension of this pest from the original point of infestation, since it is quite likely to adapt itself to feeding upon apple trees in the western New York fruit belt should its numbers increase.

Blue bottle fly maggot in child. During October and November correspondence was carried on with Dr Ruth Gilbert and Dr L. J. Early, both of the State Department of Health, concerning a rather unusual condition of myasis in a child. This little girl, 20 months of age, had been treated by Dr E. H. Evans of Guilford, N. Y. Doctor Evans reported to the State Department of Health that the child had been sick for 45 days. For the first 3 weeks the temperature had run from 103 to 106 degrees with continued application of ice bag to the head. During the second week the child developed true meningeal symptoms and these continued for about 5 days. No pain was felt at any time. There was some abdominal distention but this was easily relieved by enema or tube. At no time was there any definite train of symptoms from which a diagnosis could be made. Two trained nurses were in attendance. On the date in November on which Doctor Evans wrote he stated that on that day the child had a temperature of 102 degrees and was taking a normal amount of

nourishment, but was very sick. After the use of calomel one Dipterous larva was passed in the feces. Whether more than one maggot was present in the intestinal tract is not known. This was determined as one of the common blue bottle fly maggots. Apparently, the child, even though so young, must have had access to blown meat.

Serica parallela Casey. On August 13, 1923, a letter was received from Thomas Dicket of New Rochelle, N. Y., accompanied by specimens of a beetle with a statement that they had destroyed every young flower and vegetable in his garden, and that it seemed almost impossible to poison them with arsenate of lead or any other spray which had been used. They were first noticed eating dahlia plants. The beetles seemed to come from the ground at night and fly on the foliage. Mr Dicket further stated that his neighbors were having trouble with the beetles and nobody in the vicinity had ever seen the insects before.

Mr D. B. Young determined the beetles as a species of Serica apparently not represented in the State Museum collection. Specimens were sent to Doctor Howard at Washington, who replied under date of August 22d that W. S. Fisher had determined them as Serica parallela Casey. This species is listed in Leng's Catalog as a synonym of S. sericea, but it does not agree in several respects with the specimens of sericea in our collection.

On August 22d Mr Dicket wrote further that these beetles damaged severely his dahlias, asters, calendula and young chrysanthemum plants and in a neighbor's garden had destroyed an entire patch of lettuce. He stated that the beetles fed only at night and when disturbed dropped to the ground and instantly burrowed into the soil or flew off to other quarters. Apparently at this time the beetles were not so numerous as they were 2 or 3 weeks before.

A cursory search through literature failed to give any information concerning the life history or habits of the species under question.

Diprion simile Hartig. During September a letter was received from Mrs Clara H. Spain of Pleasantville, N. Y., accompanied by sawfly larvae, with a statement that these were doing great damage to several pine trees on her place. The needles were being eaten and webbed together by large numbers of these pests. The larvae proved to be those of Diprion simile, a sawfly from Europe which has quite recently become established in Connecticut on pines, but which has heretofore apparently been practically unknown in New York State.

Folsomia fimetaria (Tull) in a well. On November 13th Mr L. M. Wachter, chemist of the division of laboratories and research at the State Health Laboratory, Albany, forwarded to the office specimens of springtails taken in the well of Clyde J. Benedict of Lewis, N. Y. These were determined by Dr J. W. Folsom as Folsomia fimetaria. It is one of the commonest species of springtail in Europe and North America, and often occurs about the roots of plants and on the surface of soil. It has several times been recorded as occurring in wells, but is in no way adapted for existence in the water. Since the insects occurred in large numbers on the surface of the well water, Mr Bennett wished to get rid of them. It was suggested that hot water or steam would kill them. It was further recommended that the well be concreted up to a curb just above the surface of the water, in order to prevent the insects working their way into the well in the future.

Oriental peach moth (Laspeyresia molesta). L. F. Strickland, inspector for the Department of Farms and Markets, located in Niagara county, on September 6th and 23d transmitted specimens of peaches infested with several very young caterpillars which undoubtedly were those of the Oriental peach moth. Specimens were also sent to Dr W. T. M. Forbes of Cornell University, who confirmed this tentative determination as being correct, although the larvae were very small. The pest is therefore undoubtedly present in small numbers in Niagara county, at least in the vicinity of Lockport. It occurs on Long Island and also to a slight extent in Westchester county, but the exact distribution of the pest in New York State has not been carefully worked out. It is undoubtedly present, however, in other localities, at least to a slight extent.

Tetrolopha robustella Zeller. On October 16th C. H. Zimmer of the Department of Farms and Markets sent to the office twigs of Austrian pine infested with caterpillars, apparently from Lynbrook, Long Island, with the statement that the insects were badly damaging the needles, and that there seemed to be considerable of this trouble on Long Island. The caterpillars were transmitted to the United States Bureau of Entomology for determination and were identified by Mr Heinrich as Tetrolopha robustella. Under date of November 17th Mr Heinrich wrote that the species is found throughout the eastern United States as far south as Florida. He stated that as the species of Tetrolopha is rather hard to rear and since not many adults have been obtained from pine nests, it is barely possible that another species is the one involved in the infestation. Tetrolopha has usually only one

generation, according to Mr Heinrich, and winters in cocoons in the ground under the infested trees. The adults fly in summer. Spraying is of very little value unless the work can be done early in the course of the infestation when the larvae are young and the nests are not well formed. After this time, it will probably be found necessary to cut and burn the infested twigs.

European hornet (Vespa crabro L.) In October there was received from E. H. Costich of Hick's Nurseries, Westbury, Long Island, specimens of this European hornet with samples of its injury to lilac and apple twigs. The damage was done on the place of Tracy H. Harris, who apparently is located in the vicinity of Westbury. On October 23d Mr Harris wrote that the European hornet had been a source of trouble to him at his Long Island home for several years. He stated that the hornets attacked the trunk of one of his large apple trees, gouging out holes in the bark about one-half inch in diameter and that apparently they fed upon the sap. According to Mr Harris, the hornets appeared along about the first of October and continued up until frost. In 1921 their nest was located in his garage, between the ceiling and the rafters, and he was unable to get at the nest without destroying the ceiling or the roof. Since then he has not been able to locate their nests. The most effective means of killing the pest seemed to be by the use of a heavy rubber fly swatter. Mr Harris stated that by this means he had killed at least 100 of the hornets within 2 weeks.

Insect collection. The New York State Museum study collection of insects now comprises the equivalent of about 1000 Schmitt boxes in addition to the Lintner collection and the Hill collection of moths and butterflies. This collection has been built up during the past 20 years by exchange and by active collecting by members of the office of the State Entomologist. Mr D. B. Young has undoubtedly contributed more specimens to this collection than any other single individual. About 75 per cent of the insects are from various localities in New York State and since many of the groups have been named by specialists it is one of the most important collections of New York State insects in the country. Specialists, particularly those in this State, should be encouraged to use it as a repository for duplicates of New York State insects, and many of them are coming to do so.

The past year has seen important contributions to the general collection, both in specimens collected and in groups rearranged. The Associate and Assistant State Entomologists, with the active cooperation of Sherman C. Bishop, State Zoologist, and Professor C. R.

Crosby of Cornell University, have added from 10,000 to 12,000 specimens from various localities in New York State. About 5000 of these were collected by Mr Young at Wells, N. Y. Mr Bishop and Professor Crosby made important contributions of beetles and other insects collected during the past season in Virginia and North Carolina. Doctor Leonard has collected many Diptera, particularly the more minute species, and has rearranged several of the groups. Many Thysanura and Collembola, collected by the above-named workers, have been determined during the past year for this office by Dr J. W. Folsom and we now have one of the best determined collections of these little known insects in the country. Dr H. C. Huckett of the Long Island Experiment Station contributed about 500 Long Island Diptera and has also rearranged many of the Anthomyid flies. Dr C. J. Drake of Iowa has named our lace bugs and donated specimens of eastern species heretofore unrepresented in the collection. The Tabanidae have been rearranged and specimens contributed by Mr Brimley of North Carolina, Doctor Johannsen of Cornell University, C. W. Johnson of Boston, and others. C. Howard Curran of the Entomological Branch, Ottawa, Canada, and M. C. Van Duzee have rearranged the Dolichopodid flies and contributed specimens unrepresented in the collection. Doctor Matheson of Cornell has worked over the mosquitoes; R. C. Shannon of the Bureau of Entomology, the Syrphidae; L. B. Woodruff, the Membracids; Charles Schaeffer, the Donacias, and Mr Young has rearranged and determined many beetles.

The insect collection is fully as important as the entomological library and is in daily use for reference in handling correspondence and in determining specimens sent in by various correspondents. There is great need for an additional worker in the office who would have the time and ability to spend considerable effort in assisting Mr Young in taking care of this important collection.

Insect Pest Survey. The office of the State Entomologist has cooperated very actively with the Insect Pest Survey conducted by the United States Bureau of Entomology. Several correspondents in various parts of the State have supplied considerable information, which has been transmitted through this office. This is an important project and should be given the heartiest cooperation in the future. The office in Washington looks toward the day when insect outbreaks will be forecast in much the same way and with somewhat the same accuracy as the weather bureau makes its forecasts. This will only be made possible, however, through the most active support of the several states.

New York State list of insects. Ten years ago the various entomologists in the State launched a cooperative project to list the various species of insects known to occur in New York State and as far as possible the detailed distribution of each within the State. Dr J. Chester Bradley of Cornell University was made editor-in-chief and the various major groups were placed under the immediate supervision of certain specialists who acted as subeditors. Many data were compiled, but for various reasons Doctor Bradley during the past few years has been unable to push the project actively. On his coming to Albany, the Associate State Entomologist was urged by all the entomological workers in the State to assume active editorship of the list and to see it through to a final conclusion. This he agreed to do, realizing it as one of the most important projects he could undertake. The accurate listing of the approximately 25,000 species of insects in the State is a considerable undertaking but it will lay the foundation for important work of a highly practical application and will also encourage amateurs in the collection and study of New York State insects. The task requires the most painstaking scientific accuracy on the part of the best specialists and a detailed knowledge of their various groups. The active cooperation of more than seventy-five workers is now enlisted and the work is well along toward completion.

Cooperation. As in the past, the office of the State Entomologist has continued to cooperate closely with various agencies. Some assistance was given to the spray service specialists located in the Hudson river valley under the general supervision of the New York State College of Agriculture. The office has acted in a consulting capacity on many occasions with the Department of Farms and Markets and also with the State Health Department and a number of the county agricultural agents. Close touch has been kept with the work of the entomologists at the Geneva Experiment Station both by correspondence and by personal contact. The Associate State Entomologist has acted as collaborator in European corn borer control with the United States Bureau of Entomology at Washington.

Conferences. During the past year the Associate State Entomologist attended a general corn borer conference and field trip at St Thomas, Ontario, Canada; the field meeting of the northeastern entomologists in Connecticut; the New York State Fruit Growers' Association meeting in Rochester, and Farmers Week at the New York State College of Agriculture. At this latter and also at the diamond jubilee meeting of the Entomological Society of Ontario,

held at Ottawa, he presented a paper on "The Apple and Thorn Skeletonizer."

Publications. The Associate State Entomologist has published but one paper during the past year. This was on The Immature Stages of the Catnip Leaf Hopper, Eupterix melissae, and was published in joint authorship with George W. Barber of the United States Bureau of Entomology, in the Journal of the New York Entomological Society, December 1923.

Acknowledgments. Particular acknowledgment should be made of the hearty cooperation and assistance given by various specialists of the United States Bureau of Entomology, through Dr L. O. Howard, its chief, in making determinations of specimens and in supplying information of various kinds. Without the important clearing house which the Bureau of Entomology forms, for determination of the more doubtful forms and for information in their files, the speed and accuracy of handling the very considerable variety and bulk of correspondence on entomological matters would be greatly retarded.

ZOOLOGY

REPORT BY SHERMAN C. BISHOP, *State Zoologist*

The report of the State Zoologist is presented in two parts which deal respectively with the activities of the Division of Zoology and with some proposals for expansion of the work along lines that will permit greater use of the educational facilities afforded by the Museum's collections.

Investigation. The Zoologist has continued the study of the amphibian fauna of the State and the preparation of a descriptive catalog of the spiders. The members of these groups are widely distributed, easily found and cared for and furnish particularly valuable material for the use of teachers and students of nature study and biology. Salamanders have lately come into greater prominence as subjects of investigation in the problems of endocrinology and it is therefore desirable to collect more accurate data bearing on their development, life histories and habits.

Field work. Many species not before represented in the collections have been added during the year by intensive field work in the vicinity of Mount McIntyre, Keene Valley and Adirondack Lodge in the Adirondacks, in the Helderbergs, and at Ithaca and Canandaigua lake. During October 1923, Professor C. R. Crosby of Cornell University and the Zoologist collected in the Blue Ridge mountains of western North Carolina and brought together for the Museum a collection of 500 amphibians and reptiles and several thousand spiders and phalangids. Special reports which have been prepared on the salamanders and arachnids include descriptions of nine new phalangids and about twenty new spiders.

Accessions. The museum is indebted to Benjamin W. Arnold of Albany for a remarkable collection of Atlantic starfish selected and preserved by him in such a manner that the natural beauty of color and texture is largely retained. The series includes representatives of all the common species to be found on the New York coast. C. S. Brimley of the North Carolina Agriculture Department at Raleigh, presented a series of salamanders from the eastern part of the state to supplement the collections made in the Blue Ridge mountains of western North Carolina.

New groups. The starfish presented by Mr Arnold have been arranged for exhibit by the assistant to the Zoologist, Maria Seguin, and exemplify in some half dozen species, the natural phenomenon of variation as it is expressed in form and color.

Work of the assistants and taxidermist. Within the period covered by this report the Division of Zoology has had and lost the services of two well-trained and capable assistants. It is very evident that the time has passed when a skilled worker may be retained at a salary less than that paid to clerks and stenographers. As assistant to the zoologist, Augusta Wolf worked over the entire collection of invertebrates, identified and labeled the extensive phalangid series and contributed largely to the preparation of manuscript catalogs of spiders, amphibians and reptiles. Miss Wolf resigned in September 1923 to accept a teaching position and was succeeded by Maria Seguin. Routine work of the office—cataloging, preparation of specimens for study and exhibition purposes, etc.— occupied the time of Miss Seguin from the time of her appointment until February 15, 1924, when she tendered her resignation.

The taxidermist, Arthur Paladin, has devoted much of his time to cleaning the mounted specimens of birds and mammals in Zoology Hall and restoring the small habitat groups that have suffered from time and exposure to strong light.

Suggestions for development. In the New York State Museum, material for exhibits in zoology has been selected chiefly from those groups of animals whose representatives are comparatively large and conspicuous and which lend themselves readily to effective treatment. Other groups of no less interest to the Museum-visiting public have been neglected, not only because of lack of exhibit space but because they require, in their proper presentation, the treatment and handling that can be given only by a specialist trained in modeling and casting and the preparation of accessory group material. It is obviously impossible to have satisfactory group work done outside the Museum by workmen unacquainted with the limitations of the Museum. Under the conditions imposed by the lack of space and properly designed cases, and suitable systems for the control of light and reflection, it is impossible to display much interesting material already in the collections. These conditions may be remedied by adding to the staff of the Division of Zoology a trained and experienced preparator, by replacing certain ill-designed cases with others better adapted for special exhibits and finally, by supplementing the present overhead system with lighting units placed in the separate cases.

The State Museum, and particularly the Division of Zoology, has not kept pace with similar institutions in making its resources fully available for the use of teachers and students in nature study and

biology in the public schools. This may be attributed both to the lack of space in the public halls and to the failure of the teachers themselves to make the Museum an adjunct of the classroom. Special classes of exhibits frequently changed and arranged to meet the need of both teachers and students throughout the school year would do much to advance nature study and biology in city schools beyond the stage of bean growing and textbook study. It would be to the material advantage of the public schools if the city budget could provide a teacher, trained in nature work, to cooperate with the Museum in the presentation of materials relating to natural history, for under such an arrangement exhibits brought together for the purpose could be made to supplement the work of the classroom and laboratory.

ARCHEOLOGY AND ETHNOLOGY

REPORT BY ARTHUR C. PARKER, *State Archeologist*

An analysis of the various activities of this division and the methods of approach have appeared in a previous report, making a repetition unnecessary. In general it may be stated however, that the work consists of making field examinations and excavations of aboriginal sites, conducting field and laboratory studies in ethnology, in collecting folk-lore, in caring for the collections acquired and in conducting the work of the office which consists mainly of correspondence, consultation and research.

Field work. Field examinations were made of certain sites in the Genesee valley, the Hudson valley near Athens, and in Jefferson county, but no excavations have been conducted this year owing to an injury received by the archeologist. The plans which had been made for work were laid aside and the men engaged dismissed.

Certain collections were visited and examined in detail, among them the new collection of Alvin H. Dewey of Rochester, and the collections of Willard E. Yager of Oneonta and of George L. Tucker of Buffalo. Each is representative of its locality. Mr Yager has based an extensive work in several volumes on the data of his collection which embraces many valuable objects from the upper Susquehanna valley.

Condition of the collections. The collections of this division are housed in the two upper mezzanine floors of the museum and run the entire length of the building. In the west hall, termed the Myron H. Clark Hall of Iroquois Ethnology, are the six Indian groups and at the western end are the ethnological collections and osteological exhibits. In the east hall, termed the Lewis H. Morgan Hall of Archeology, are the archeological exhibits. These collections require constant curatorial oversight; new exhibits are installed from time to time and old ones taken out and stored. During the year we have prepared for exhibition the Coxsackie flint mine hill material, the Vine Valley discoveries and the L. V. Case loan exhibit of Egyptian and Mesopotamian objects.

New accessions. During the year donations of material have been received from Jefferson Ray, W. R. Blackie and Otis M. Bigelow. Mr Ray presented the Museum with a fine basket hamper made about 1790 by the Indians of Coxsackie hills, and some very fine material from Old Orchard Point and from Indian Fields. Mr Bigelow presented a collection from the town of Cicero. The

Blackie collection was French neolithic material from the Dordogne region. We received as an exchange some unusual material from A. Barrett who collected it in Tasmania.

Through the courtesy of Mrs Mary Clapp Curtis we were presented with a remarkable collection of Mescalero ethnological material collected by her late husband, Dr A. J. Curtis in New Mexico, where he was the Indian Agent and Peace Commissioner in 1870-73 under appointment by President Grant.

Correspondence and consultation. The archeological section of the Museum receives numerous letters requesting information. These vary from questions of history and ethnology to requests for Indian names and for material for works on history, drama and fiction. School teachers and pupils have contributed largely to our correspondence. With the numerous requests that have come in for addresses, papers and lectures, the office has been kept busy with paper work. The burden of all this falls on the Archeologist himself.

We receive numerous calls from teachers, writers, artists, anthropologists, students and others interested in American Indian archeology and ethnology.

Since this office has accumulated considerable information along general Indian lines, especially in the subjects of law, education and social conditions, it has been consulted by the Attorney General's office, the United States Indian Bureau, the Interior Department, and other federal and state offices.

Frequently other museums and historical societies have asked for expert assistance or contributions to their reports. We have usually been able to meet the request.

Conferences and inspections. During the year this office has participated in the deliberations of the New York State Indian Welfare Society at the Albany meeting; the New York State Archeological Society at the meetings in Rochester and Albany; the Genesee County Historical Federation at Batavia and the New York State Historical Society at Lake Placid. In each of these deliberations the Archeologist supplied a major paper.

Inspection and study have been made of the archeological collections, especially those of the Algonkian and Iroquoian cultures, in the museums of the Buffalo Historical Society, the Holland Land Purchase Historical Society, the Ontario County Historical Society and the Wyoming Historical and Geological Society of Wilkes-Barre, Pa.

Literary contributions have also been made to the Buffalo Historical Society, the History of Buffalo, the History of the Genesee

Country, the Researches and Transactions of the New York State Archeological Association and to the Provincial Museum of Ontario.

Assistance has been rendered the Municipal Museum of Rochester and the Buffalo Historical Society, in the matter of the George L. Tucker collection.

Laws and legislation. During the year this division prepared two bills for introduction in the State Legislature, one seeking to have the State acquire for the State Museum the flint quarries at Coxsackie, and the other making the manufacture and sale of fraudulent archeological artifacts a misdemeanor, punishable by fine or jail or both.

The first bill was designed to make an archeological monument of the ancient flint mines of the Algonkin Indians and with the surroundings to provide a wild flower and bird sanctuary. The principal owners of the 43 acres which we desired to acquire were willing to let us have their share of the property for $1500. The bill, which had the backing of many influential people as well as the State Archeological Society was passed by both houses of the legislature, but was not signed by the Governor.

The fraud bill was introduced concurrently by Senator Dick and Assemblyman Griffiths. It was passed by both branches of the Legislature and became effective on September 30, 1923. With this law on the statute books we now have effective means of reaching offenders who for years have been making and selling fraudulent pipes and copies of other aboriginal objects.

At the Batavia meeting of the Genesee County Historical Federation the Archeologist suggested that the federation support some specific program and recommended that the federation take measures to acquire the environs of Indian Falls on Tonawanda creek between Buffalo and Batavia, as a state park. The plan at once met with hearty approval and the indorsement of influential men and organizations. It has been incorporated by the state parks committee of the New York State Association in their report on the State park project.

Archeologically this park will have considerable interest for it covers traces of the Neutral nation flint workers whose quarries were along the escarpment at Divers lake which is embraced in the park plot.

Status of the Iroquois Indians. During the past year or two there has been considerable interest manifested in the legal status of the Iroquois, or Six Nations, of New York and Ontario. This is

due to the fact that these Indians were parties to well-defined treaties which they have endeavored themselves to keep with scrupulous regard. This has produced a singular condition of affairs in New York. The Indian governments claim that they are independent sovereignties having treaty relations with the United States but not under its control except as specified by the treaties. The Federal Government claims that they are wards, and as such are amenable to federal control. Nothwithstanding this claim, the Federal Government has done nothing to assist these Indians in attaining civilization and competency, save for a few instances when pupils are received in government schools. On the other hand, the State of New York for more than a century has supplied for the Indians schools, orphanages, health supervision, charitable aid, and even provided certain scholarships in normal schools. It has built and maintained for them roads and bridges. Before New York was a state in the federation, it entered into treaties and agreements with the Indians, and the first State Constitution gave the Governor and the Legislature the right to treat with the Indians. When the State became a part of the Nation it still persisted in its rights in this direction and repeatedly passed laws aiding and regulating Indian affairs, many times at the request of the Indians themselves. The Seneca Nation in its constitution of 1848 recognizes the right of the State to intervene and to legislate for it.

Under the Woodbury opinion, rendered by the State Attorney General's office, it is now held that the State never did have the right to legislate for the Indians and that all such legislation is invalid. For example, the State can not under this decision enforce the compulsory education act, though it supplies the schools.

Under the conditions of this triangular contention, it is held by many friends of the Indians that reservation conditions are not such as are best for the Indian people. All friends of the Iroquois agree that something must be done to fix definitely the legal status of the Six Nation People. In 1920 at the Rochester meeting of the Indian Welfare Society, the Archeologist suggested that the Federal Government begin suit in the Supreme Court against the State of New York, for the purpose of testing and determining the relative rights of the State and the Nation over the reservation Indians. Apparently this suggestion has borne fruit and now plans are under way to start such a suit. As a member of the State Indian Commission the Archeologist has been active in endeavoring to obtain legal action along these lines. With the abolishment of that commission, the Archeologist was appointed by the Secretary of the In-

terior a member of the committee of citizens on Indian affairs, and as the chairman of this body has been cooperating with federal and voluntary bodies interested in Indian welfare.

The Six Nations of Canada have had some similar trouble with the Dominion authorities. The Six Nations there always regarded themselves as allies of Great Britain, and their treaty with Sir Frederick Haldiman, giving them the Grand river tract, as "His Majesty's faithful allies," assured the Indians who left New York State after the Revolutionary War, a homeland and independence. It now appears that Canada wishes to declare all the Six Nations Indians citizens and in order to enforce the enfranchisement act has stationed Dominion police on the Six Nations' domain. The Six Nations have protested and have carried their complaint to the League of Nations for its intervention.

These actions and attitudes of the Six Nations Indians on both sides of the line is typical of their entire history and indicates their energy and national persistence.

FUNDAMENTAL FACTORS IN SENECA FOLK LORE

BY ARTHUR C. PARKER

Basic Premises

The myths and legends of the Seneca Indians are built upon certain well-recognized and deeply rooted postulates. Each bit of folk lore must have its consistency adjudged by these elements in order to be credible. Any myth or legend that offended the standards so set would immediately be rejected by the Seneca as spurious. To a large extent the premises of folk lore are founded on folk thought, and woe to the innovator who sought to direct his theme from the accepted thought patterns.

Among the basic beliefs upon which the folk tale is built are the following:

Unseen spirits. Spirits pervade all Nature and affect man for good or ill. Their desires and plans must be satisfied by man. There are both good and evil spirits. Spirits may inhabit anything in nature.

Conflict of good and evil spirits. Good spirits are constantly making war upon evil spirits.

Magical power. There is such a thing as orenda or magical power. Such power makes its possessor the master over the natural order of things. This orenda may be acquired in various ways. It may be residual, and therefore an attribute of the individual, or it may be inherent in some charm or fetish. Virtuous persons may be given a good orenda, which is always more powerful in the end than the evil orenda which is possessed by witches and sorcerers.

Transformation. Any being possessing orenda may transform himself into any form, animate or inanimate, as his orenda gives power. Anything seen in nature may be a temporary or a permanent transformation of a being having orenda. Transformation may be by command or by entering the skin of the creature whose form one desires to assume. Animals having orenda may assume human form and mingle with human beings. A group of people, therefore, may in reality be a transformed group of animals, and likewise with individuals.

All nature is conscious. Everything in the Seneca philosophy lives and is conscious. It is a being and in communication with other parts of Nature. Anything in Nature may be spoken to and it will hear what has been said. It may be induced to act in one's behalf.

All living creatures have souls. The Seneca believes that animals have souls that are like in their nature to the souls of human beings. The hunter, therefore, propitiates the soul of the animal he kills,—and explains why he killed it. The souls of friendly animals help man, if man has been courteous, and has properly propitiated them. Souls of evil animals injure men and must be "bought off." The souls of all creatures return to the maker of souls just as man's does.

Master of souls. There is in the heaven world a master of life and soul. He allows his subordinate spirits to rule the earth world and concerns himself generally with his own realm. Souls that return to him are taken apart and readjusted that they may function properly in the immortal realm. Evil is therefore conceived in a measure as a maladjustment or a pollution of the soul's parts.

Ghosts. The manes of departed men and animals wander over their familiar haunts and startle men by their "materializations." Wandering ghosts generally want something and must have their desires satisfied. The evil of the living person is intensified in the ghost. A ghost is the body spirit and not the real psychic personality.

Dreams. Dreams are experiences of the soul as it leaves the body during sleep. The dream god guides the soul to its dream experience. Dreams that prompt the individual to certain desires must be interpreted by a chosen person or by volunteer guessers, and the desire must be satisfied, or calamity will befall the dreamer as well as the unsuccessful guesser. Prophetic dreams must guide action and dream demands must not be lightly set aside.

Monsters. There are monsters that men seldom see. These affect the welfare and the destiny of man. They are generally evil and seek to destroy and sometimes to eat human beings.

Wizards. There are such beings as wizards, witches and sorcerers. These beings possess an evil orenda and seek to destroy innocent people.

Gods, Major Spirits and Folk Beasts of the Seneca

Beings of the Primal Order

The first of the god beings was Te'hao^{i}'hwĕñdjaiwă'"kho^{n}' or *Earth Holder.* It was he who ruled the sky world and lived in the great celestial lodge beneath the celestial tree. As the result of a dream, this chief, who also bears the title, *Ancient One,* was moved to take to himself as a wife a certain maiden, known as Awĕ^{n}'hă'i', Mature Flower (Fertile Earth). Mature Flower consented to the

betrothal, but due to the embrace of her lover inhaled his breath, and was given a child. The attention she gave this child caused Ancient One to be moved to jealousy, this emotion being aroused in him through the machinations of the *Fire Beast,* whose invisibility rendered his work the more subtle. Little is known through mythology of Ancient One, since his field is a celestial one, and he seldom interferes with the doings of men of our present order. Of his unhappy wife, who was cast through the hole made by the uprooting of the celestial tree, we learn more.[1]

The wife of Ancient One was Iage^{n}''tci', also meaning *Ancient One* (Body). We recognize her in the Huron myths as recorded or mentioned in the Jesuit Relations at Ataentsic (Ataaentsik). In Onondaga this would be Eiă' tăgĕ^{n}''tci'. Her story is given in all versions of the creation myth.

Her personal name seldom appears, but Hewitt gives it as Awĕ^{n}'hā'i', this referring to her maturity, or ability to bring forth seed. In some versions the chief casts his wife into the abyss made by uprooting the celestial tree, Gai^{n}iă''tgä''hei'; in others her own curiosity is responsible. The tree in such versions is uprooted as a dream demand and her enraged husband pushes her into the hole made thereby through the crust of the heaven world. After the completion of the earth world the sky mother returned by way of an ethereal path that was plainly visible to her, this having been made by her daughter, the first born and the first to die of earth creatures.

Fire Beast (Gaăsioñdie' t'hă'), appears to have been one of the important primal beings, and to have exercised a malign influence even upon the inhabitants of the celestial world. He is described as of "sky color" or invisible, and he is detected only when he emits streams and flashes of light from his head. When a meteor flashes the Iroquois recognizes the Fire Beast. His appearance is counted as a sign of direful calamity and death.

Whirlwind (S'hagodiiw^{n}''gōwā or Hadu''i'), was also a primal power of great importance. He is the controller of the violent winds, and he takes his name, He-who-defends-us, from his promise to help mankind when threatened by calamity. His symbol is the crooked-mouthed false face. There is also the concept of the four defenders, one for each of the cardinal directions. It was Whirlwind who boasted his power to the Good Mind (Iouskeha) and who had the contest with him of mountain moving. The face became

[1] Consult Hewitt in Handbook of the American Indians, under his article, Teharonhiawagon. We have re-edited our notes in accord with his findings.

mutilated by the mountain coming too quickly against it, at the command of Good Mind. Admitting that he was now a subordinate, he agreed furthermore to drive away disease and pestilence and to defend men beings, who should be thereafter created, from malign influences. His face carved in wood, after certain propitiatory and invocatory ceremonies, was and still is used by the conservative Iroquois in their ceremonial events, particularly at the midwinter thanksgiving, when parties of masked figures go from house to house singing the magical songs deemed potent for this purpose.

The Thunderer, Hĭ''no^{n}', was another of the great beings, but he appears in the second order of mythology, as a servant to Iouskeha. He occupies a high place in the category of Iroquois gods, so high a place that it is an open question whether or not the Great Being whom the Iroquois now address as Hawĕñi'o' is not identical with the Thunderer, though there is also a recognition of the Thunderer as a separate being. The name Hawĕñi'o', apparently is derived from owĕñ'ă' (voice) and i'o (good, great, majestic or beautiful). The initial *Ha* is the masculine sign. The name thus means He-great-voice. This alludes to the thunder. The Thunderer is a mighty being, the maker of rains. He wrinkles his brow and the thunder rolls; he winks his eyes and lightnings flash like arrows of fire. The Thunderer hates all evil spirits, and he is charged with terrorizing the otgont or malicious dwellers of the underworld to return to their cave. He seeks to slay the underwater serpents and all folk-beasts that would use evil magic.

The beneficent earth god was T'haho^{n}'hiawă''ko^{n}, the light or elder twin of the Sky Woman's daughter. He is variously called Iouskeha (Huron), Hă'ni'go''io', Good Mind, Elder Brother, and Sky Holder. It was he who watched at the grave of his mother, and discovered the food plants. It was he who set forth on the journey "to the East" and obtained from his father the power to rule. He made the earth habitable for man, obtained the mastery over Thunderer and the Whirlwind, and even made his grandmother, Eiă'tăgĕ^{n}''tci' (Awĕ^{n}'hă'i') play the game of plum stones, the result of which should determine who should rule the earth. He animated his plum stone dice and gave them understanding, ordered them to arrange themselves as he directed, and thereby won the highest count in a single throw. This gave him mastery over his evil brother, Tawĭs'karo^{n} (the icy or flinty one), for the grandmother sympathized with this ugly twin brother of his. In the heaven world T'haho^{n}'hiawă''ko^{n} now lives with his grandmother, in the reunited family of celestial beings, and although he grows very old he has the power of renewing himself at will, and exercises this

power over good souls that come into the heaven world. He created man after observing his own reflection in a pool of water, after which he made minature figures in clay and commanded them to live.

Tawĭs'karo^{n} was the second born of the daughter of the Sky Woman. He was of destructive nature, and found his way to life through the axilla of his mother, killing her at birth. His heart was made of ice or of flint [the words are similar]. His delight is in destroying living things, especially by freezing. He created all the evil beasts, serpents, insects and birds. He invented thorns, briars, and by kicking at the earth made cliffs and precipices. During his career he stole all the good animals and hid them in a cave; he drove all the birds away. His great feat was in stealing the sun and hiding it in the far southwest. Aided by the fires which his brother, T'haho^{n}'hiwă''ko^{n}, and his cohorts secured, the birds and animals were found and the sun was released. This of course typifies the annual triumph of summer over winter, the return of the migrating birds and the return of the heat of the sun. Tawis'karo^{n} is then confined to his cavern, hence his name Hanis'he'ono^{n}, meaning He-who-dwells-in-the-cave. With the coming of the Christian missionaries, Tawiskaro was identified with the Christian devil, (Hă'nigoiĕt'gä', bad mind).[1] Strangely, about this time it was the Thunder god, instead of the good-minded Sky Holder, who was metamorphosed into the Great Spirit, Hawĕñi'o', this name being the Seneca equivalent for Jehovah (God).[2]

Lesser known gods were Ai'ko^{n}' the Dream god, Haskotă'hiă-haks, the Head Opener and Deiodă'sondāi'ko^{n}', Thick Night. Aikon caused the dreams which demanded interpretation, and Haskotahiakaks opened the heads of soul bodies as they passed over the sky-trail (Milky Way), and examined them for good and evil thoughts, after which he ate the brains.

There is a marvelous tree in the center of the heaven world. It bears all manner of fruits and flowers.

There is also a great tree in the center of the earth. Its top touches the sky. It grew in the world of the first order and it bore flowers of light. To touch this tree is to acquire great magical power. The Whirlwinds rub their rattles against it and become full of orenda.

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[1] S'hagoewat'hă' also meaning, He punishes them.

[2] Oddly enough, the original Hebrew concept of Yahweh, (Jehovah) was of a god of the elements, particularly the storms. He manifested himself in the thunder's roar and by the lightning's flash, and blew like a great wind from the Ark of the Covenant, terrifying the Philistines.

Nature Beings

The Sun among the nature gods, is recognized by the Seneca as a powerful being. Yet, unlike the gods in other theogenies, the Sun is a creation made after the formation of the world—at least so it would appear from the common cosmogeny. The Sun was created from the face of the earth mother, yet it may be that her face was the sacrifice that brought the Sun into evidence. There is evidence of attempts to conceal the origin of the Sun in several of the myths. He appears as the messenger of the Sky Chief and as the special god of war, Ho'sgĕⁿ'age"dagōwa, he also appears as existing before the birth of the primal twins, and it appears that he is the being who sat on the mountain "to the east across the sea," and who gave power to the Good Mind, or T'hahoⁿ'hiawă"koⁿ. It thus appears there is an imperfect assimilation of conflicting myths, probably from different sources.

Each day the Sun starts from his resting place in the branches of the celestial tree, takes his path under the lifted east sky, rolls up the dome and commences his unerring watch of the movements of men. Wherever there is light, there is the messenger of the Sky Chief watching human behaviour. Returning at night, he recites all that he has observed on earth. He bears the name Endĕ'ka Gää"kwă, diurnal orb of light.

The Moon is Soi"ka Gää"kwa, nocturnal orb of light, and she is hailed as "Our Grandmother." In each of her several phases she has a different name and function. She is watched by the females as a sign of health, and by the men as a sign of hunting luck. By the moon, time is regulated, and each monthly moon has a special name. Of all heavenly bodies she is the most mysterious, though not the most powerful.

Morning Star, Gĕndeñ'wit'hą̆, is one of the great beings of the sky and her appearance is watched as an omen. Once Morning Star was an important celestial personage, but the Iroquois have drifted away from giving her special honors. She appears in several rōles, sometimes as a siren who lures hunters into a luckless marriage, mysteriously leaving them to wander the world over in search of her. She is said to have charmed an elk into loving her. She also appears as a rescuer of starving villages in time of famine. She is called Gadji'soⁿ'dą̆' gĕndeñ'wit'hą̆'.

Storm Wind, Dagwanoeient, (Dagwano'ĕñ'ien) is a being of great activity and has a whole tribe of subordinates bearing his name. He appears to men as a Flying Head, with long streaming hair, and his exploits are generally discreditable. He is a great wizard and

takes delight in destroying things. His friends are generally sorcerers and otgont (evilly potent) beasts. Many legends are related about Dagwanoeient in his various forms, for he has several transformations.

The Zephyr, Gä'ha', is a softer wind than the stormy Dagwanoeient, and appears to be of a kindlier disposition. While Gaha may have done magical things, they were not done with evil intent. There are legends that tell how Gaha wooed some fair forest maid and married her. Gaha helps plants grow and is associated with the warm season when fruits ripen and mature.

The Frost god is known as Hă"tho'. He is described as a fierce and unrelenting old man who lives where frosts and ice abound the year around. His home in the North is called Othowege. It is he who brings the frost and who causes the snows to sweep over the earth. His clothing is ice and he carries a maul with which he pounds the ice on rivers and lakes, making them crack with a resounding boom. He also causes that peculiar knocking sound on trees when the weather is very cold. He has one great enemy, the spirit of Spring, who assisted by Thaw drives him from the region that he has invaded and sends him grumbling back to the northland. The Frost god has as his friends Dagwanoeient, the Storm Wind, and Falling Hail.

The Hail spirit is called Owisondyon. He loves to startle people by coming unexpectedly in the warm months of early summer and to pelt the growing crops with his icy missles. Sometimes he is given the name, Dehodyadgaowen, meaning Divided Body.

The Spring god is Dedio's'nwineq'do^{n}. He is young and very muscular. He loves to wrestle with the winter winds and even enters Hă"t'ho's lodge and teases him to desperation while his faithful ally, Thaw, plays havoc with the ice and the drifts outside. Spring tortures the Winter god with a medicine made of blackberry juice, for the Winter god knows that when blackberries grow he is beyond the power of injuring the world. At last Spring and Winter have a wrestling match in which Winter is overcome and his bodily form melts upon the ground, while his spirit whines away, driven north by the south winds. Spring lives in Onē'na^{n}'ge', sunshine land.

The Thaw god is Dăgā'ĕ^{n}''dă, the faithful ally of Spring. When he comes in midwinter he appears suddenly and begins to wreck the icy blankets that winter has placed over the earth. Winter then knows that Spring is coming and exerts all his magic to freeze the world again and to make his reign even more terrible. Time passes

and Thaw comes again bringing his master, Spring. Then there is a fight to the finish, and Spring is supreme, while Thaw pursues ever to torment Hă"tho', on his frontiers.

The spirits of sustenance are known as Dio^{n}'he'ko. They are represented as the inseparable spirits of the corn, the bean and the squash. They are sometimes referred to as "the three sisters." The ceremonial dance in their honor is called Goñdă' goñwi' sas. There are many legends of these spirits of sustenance and the wise men and women of ancient times tell of hearing them talk together in the fields where they grow together.

Tide spirit is known as S'hagoweno't'ha, and it is he who controls the rising and falling of the great waters, twice in each day. It is said that he controls the lifting of the sky's rim in the land of Gaenhyakdondye (the horizon), which allows the sun to emerge in the morning and depart at night. Sometimes he tempts canoemen far out to sea and then crushes them under the edge of the sky's rim. He sometimes lures disobedient boys to lonely islands where witches and wizards live on human flesh. Altogether, aside from certain functions, he is an evil monster.

Will-o'-the-wisp, or Gahai" is known as the witch's torch. It is not a spirit of the first order, but merely a flying light which directs sorcerers and witches to their victims. Sometimes it guides them to the spots where they may find their charms. Sorcerers have been detected by the frequent appearance of their Gahai", which leaves their smoke holes and guides them as they ride in mid-air on their evil journeys.

Magic Beasts and Birds

Cloudland Eagle O's'hă'dą'geă' is chief among all the creatures that inhabit the air. He seems ever to watch over mankind, especially the Iroquois, and to come to earth when great calamities threaten. Living above the clouds, he collects the dews in his feathers. Some say that he has a pool of dew on his back between his shoulders. The Iroquois regard him with great reverence, for he is connected with many a worthy exploit.

Horned Snake, Gas'hais'dowăne^{n}, has several names among which are Doonă"gaes and Djo^{n}di"gwado^{n}. He is a monster serpent of the underwaters. His head is adorned with antlers of great spread, though he is also said to have monster horns shaped like a buffalo's. He is capable of transforming himself to the appearance of a man, and as such delights in luring maidens to his abode. In a few instances he appears as the gallant rescuer of women marooned

on bewitched islands. Like other monsters he has a brood of his kind, he having females as well. These sometimes lure men under water and seek to transform them by inducing them to put on the garments they wear. Horned Snake is hated by the Thunderer who spares no energy to kill him before he can dive.

Monster Bear, Niă"gwai'he'gōwa, is the most feared of magic beasts and one of the most frequent among them to enter into the fortunes of men. He loves to race and in various forms which he assumes, seeks to induce men, and particularly boys, to bet their lives on the race which generally lasts from sunrise to sunset. He has a vulnerable spot on the bottom of one of his feet and unless some hero hits this, the monster does not die. His bones form important parts of "magic medicine" and the dust from one of his leg bones if taken as a medicine, is reputed to make a runner invincible.

White Beaver, Na^{n}ga^{n}niă"go^{n}, is an otgont beast who lives in magic waters. He seldom appears, but when he does, he means disaster. Usually he is represented as the transformed son of a great witch. He is sometimes called Diat'dagwŭt.

Blue Otter is another magic beast whose home is in the water. His function is to poison springs. He has another function, that of inflicting disease by his magic, and in this way he secures offerings of tobacco.

Blue Lizard, Djai'nosgōwa, seems to be a beast looking something like an alligator. He lives in pools and is the servant of wizards and witches.

Magic Manlike Beings

The Stone Giants, or Stone Coats, Gĕ^{n}no^{n}"sgwā', are commonly described in Seneca folk tales. They are beings similar to men, but of gigantic size and covered with coats of flint. They are not gods and are vulnerable to the assaults of celestial powers, although the arrows of men harm them not at all. The early Iroquois are reputed to have had many wars with them, and the last one is said to have been killed in a cave.

Pygmies, Djogĕ'o^{n} are little people who live in caves. They are a tribe by themselves and live in houses as men do. They frequent deep gulches and the borders of streams. In some ways they are tricky, but in general they do not injure men. They are not successful hunters and are grateful for the fingernail parings of human beings. These are saved by the thoughtful and tied in little bundles which are thrown over cliffs for the Djogeon to gather as "hunting medicine." They also require tobacco and when they need it, they will tap their water drums in their meeting places. The observant then make up little packages of tobacco which they throw to them.

Out of gratitude for favors they frequently warn men of danger or assist them to fortune.

Mischief Maker, S'hodi'o^{n}sko, is a trickster, and sometimes is called the "brother of death." He delights in playing practical jokes, regardless of how they result. He possesses a store of magic and is able to transform himself into many forms. It is related in one legend that in the end he repented and returned to the sky world in a column of smoke. This appears however, to be an allusion to the Algonkin trickster.

Ghostly Legs, Ganos'has'ho'o^{n}', are beings composed only of a pair of legs, having a face directly in front, though the face is seldom seen. They appear only in the dark, and no one has ever made a complete examination of them. They have no arms or bodies, but are like the lower bodies of men, cut off at the waist. On either loin gleams a faintly glowing eye. Some have only one eye which protrudes and draws in as it observes an intended victim. The Ghostly Legs are always, or nearly always, running rapidly when seen. They usually betoken death and disaster. No one knows from whence they come or whither they go. Indians of today on some of the reservations claim to have seen these creatures. While they have never been known to injure anyone, they are at the same time as greatly feared as a ghost.

Glutton Punisher, Sago^{n}"dada"kwŭs (Sagodadahkwus), is a great being with a lean, hungry looking body, and an insatiable appetite. He seeks out gluttons, and catching them in the dark, takes a long spoon which he inserts into their vitals and spoons out his food. For fear anything may be lost he carries a kettle into which he places everything he can not immediately eat. He is the spirit of gluttony and is the terror of all who gorge themselves unduly. It is well for a man who overeats to stay indoors at night, lest He-who-eats-inwards devour everything within him. So, with his kettle and spoon, Sagodadahkwus wanders over the earth looking for the gluttons.

The Big Breast, Gonoñk'goĕs, is a gigantic woman whose breasts hang down like pillows. She roams the earth looking for lovers who sit close together in the dark. If they make one remark that seems to be improper in their love making, or if they stay at their love making too long, she leans over them, catching their faces beneath her breasts and smothering them. Then she stands upright, still holding the smothered lovers to her bosom, and walking to a cliff, leans over and drops them into the dark depths below.

The Dry Hand, O"nia'tä^{n}, is a mysterious mummified arm that flies about to bewitch those who pry into the affairs of others by ask-

ing too many questions. It will thrust its fingers in the eyes of the peeper who tries to watch others out of idle curiosity. Generally the touch of this hand means death.

Themes and Materials

There are certain characteristic types of action to be found in Seneca folk tales, and these are closely followed in all tales. However rambling a tale may be, it never departs from certain stereotyped themes, expressing as they do the accepted idea patterns over which the story is woven. Among these themes we mention the following:

1 *Transformation.* Characters in the story are able to transform themselves into any person, animal or object, as their orenda or magical power gives them power. The Seneca believed in transformation to such an extent that he was never sure that a rolling stone, a vagrant leaf fluttering along, a scolding bird or a curious animal might not be some "powered" person in a transformation stage.

2 *Magically acquired power.* The hero of a tale finds himself in a predicament and through his effort to extricate himself is endowed with magical power by which he overcomes enemies and difficulties.

3 *Overcoming monsters.* The journey of the hero is beset with magical monsters that seek to destroy him. The hero uses his wits and his orenda and subdues them.

4 *Precocious twins.* Twins are born of a romantic marriage, particularly where the hero or heroine has lost a relative. The twins rapidly grow to maturity and set forth to conquer.

5 *Contest with sorcerers.* The hero is placed in opposition to a sorcerer and matches his power against him, finally killing the sorcerer.

6 *Son-in-law put to tests.* The hero is allowed to retain his place, possessions or mate provided he procures certain magical objects for the sorcerer. In some stories an evil mother-in-law demands such objects as the magical beaver, white otter, or blue lizard. The hero obtains them very quickly and sometimes calls a feast to eat them. The mother-in-law is angry because these beasts are her brothers.

This is a widely diffused theme and is found from one coast to another.

7 *Dream animal rescues hero.* The hero finds himself in a predicament and remembering that a helper appeared to him in a dream, calls upon it for rescue. A rescue is made.

8 *Race with monster.* A monster, generally a monster bear, becomes enraged at or jealous of the hero. The monster challenges the hero to a race, the winner to kill the loser. The hero wins, generally by aid of some fetish given by his uncle or grandfather.

9 *Boaster makes good.* The hero boasts his power to do certain things, for example, to run faster than any living creature. He is warned to stop before the spirits of swift-running beings hear him. He continues to boast and a monster comes to the door to make the challenge. See 8 for a continuation of this theme.

10 *Impostor fails.* A jealous rival overcomes the hero and strips him of his clothing. The hero becomes weak and old while the impostor becomes youthful. The impostor now assumes the character and rights of the hero. Finally he endeavors to perform the magical tricks of the hero and fails miserably.

Skinner in J.A.F.L. 27–99, cites this as a central Algonkin theme.

11 *Thrown away boy.* A child is thrown away because it seems too small to live, or it is lost in a blood clot and cast into a hollow stump. The boy that was thrown away lives and becomes a powerful being who achieves wonders.

12 *Hidden lodge child.* A child born with a caul is concealed in a lodge, generally under an inclosed bed. It is cared for by some elderly person, generally an uncle or aunt. A normal brother endeavors to rescue it, being told of its existence by some magical being; or the child is hidden to protect it from an evil sorcerer who wants to steal it. The hero overcomes the sorcerer.

13 *Double deceives sister.* A youth lives in a secluded cabin with his sister. The youth's double comes to the lodge when the hero is absent, endeavoring to seduce the sister. The double is repulsed. The sister will not believe her brother has not insulted her. The brother finally makes a sudden return from a hunting trip and apprehends the double, killing him.

Skinner in Anthrop B. of A.M.N.H., XIII, 528, cites this as a Menomini theme.

14 *Uncle and nephew.* An uncle and nephew live together in a secluded lodge. Uncle generally becomes jealous of youth's ability and desires the woman predestined for the nephew. In other cases uncle assists nephew to find lost parents. Generally the uncle guards the nephew and forbids him to go in a certain direction. Nephew disobeys orders.

15 *Evil stepfather.* The stepfather endeavors to rid himself of an unpromising stepson. He hides the boy in a cave or hole which he stones up. The boy is rescued and taught by animals, and finally returns a powerful being and confronts his stepfather.

16 *Witch mother-in-law.* A youth marries the daughter of a witch who endeavors to cause his death through conflict with monsters. See 6 for continuation of motive.

17 *Animal foster-parents.* Animals find an abandoned boy. They discuss which one will care for him. A mother bear generally succeeds in securing him and takes him to a hollow tree where he is protected and educated in animal lore.

18 *Bewitched parents.* A boy finds that he has no parents. He asks his uncle or grandfather where they are and is told that they are under some evil enchantment and secured in a place beset with magical monsters. The boy overcomes the obstacles and rescues his parents.

19 *Obstacles produced magically.* The hero is beset by a witch or monster. He flees and upon being pressed creates obstacles by dropping a stone and causing it to become an insurmountable cliff. He casts pigeon feathers and conjures them into a great flock that makes a slime that is impassible, or he finds "uncles" who interpose barriers for him, as webs, nets, holes, pits etc. The hero finally escapes to lodge of a waiting mother-in-law.

20 *Lover wins mate.* A young man marries the girl of his choice in spite of the tricks of older rival and the enmity of sorcerers. This must have been a popular theme in a society where the old were married to the young.

21 *Jealous sister-in-law.* Sister-in-law offended at hero's choice seeks to harm bride or to kill hero.

22 *Magical monster marries girl.* The monster may be the horned snake or the Thunderer.

23 *Thunderer wars upon horned snake.* The Thunder god hates the horned serpent and fights it.

24 *Turtle's war party.* The turtle gathers a company of offensive and loyal warriors. All are killed in action save the turtle who begs not to be placed in water when captured. He is thrust in a river and escapes.

25 *Bungling guest.* An evilly inclined trickster plays practical jokes. He performs magical acts and induces a guest to imitate. Success attends in the presence of the trickster and perhaps once in a private rehearsal, but miserable failure attends the demonstration before others.

26 *Sorcerer's island.* A sorcerer lures the hero to an enchanted island. The sorcerer has control of the tides and currents of water.

27 *Restoring skeletons.* The hero finds bones of persons slain by sorcery. He commands them to arise quickly "before I kick over a hickory tree," and skeletons rise so quickly that bones are mismated. This is a popular ending of stories.

28 *Vampire corpse.* The body of a dead sorcerer revives and procures hearts of living victims which it eats at leisure in its grave.

29 *Dream demand.* The hero guesses the meaning of a fabricated dream and satisfies it, thereby thwarting intentions of the witch who pretended to dream.

30 *Sky journey.* Brothers journey to rim of horizon and seek to go under it and enter the sky world. All succeed but one who is so cautious that he makes a late start. The sky comes down and crushes him. His spirit speeds ahead and greets living brothers when they arrive. Regeneration by Master of Life.

Stereotyped Objects and Incidents

Incidents

1 Lonely bark lodge. Hero and associates live in secluded hut.

2 Twins play in ground. Twins find an underground world in which they live and play.

3 Hero spies upon associate through hole in his blanket. He discovers the secret of associate's power and tries this in associate's absence.

4 Monster is shot in vulnerable spot in foot and is killed.

5 Hero in contest kills magical animal. He alone is able to pull out the arrow, thereby establishing his claim to power or reward.

6 Hero's double buried in fireplace speaks through fire and reveals his murder to his mother.

7 Burning witch's head explodes, sending forth cloud of owls.

8 Sorcerer controls flow of waters. Almost captures the hero fleeing in a canoe by drawing the current of the water toward himself. The hero reverses the current and escapes.

9 Magical objects are concealed under a bed. Hero dreams he wants them in retaliation for his "uncle's" evil desires.

10 Pursuing or sentinel monsters are pacified by gifts of meat.

11 Youth not yet able to hunt practises shooting at an animal's paw hung on lodge rafter.

12 Sorcerers' hearts or livers are concealed in a safe place in their lodges, guarded by conjured dogs or ducks. Hero finds hearts and destroys sorcerers.

13 Hero obtains hearts of enemies and squeezes them, causing enemies to faint. He dashes them on rocks and kills enemies.

14 Hero conjures lodge of witches into flint. He orders it to become red hot and so destroys enemies.

15 Hero learns how to jump through the air.

16 Hero reduces sister to miniature and places her in a conical arrow tip, shooting her away to safety. He follows by magic flight, creating obstacles as he goes.

17 Corn rains down into empty bins of starving people. The corn maiden comes to marry hero whose younger brother is ungrateful for food, casting it in fire thereby burning the corn maiden's body. She departs.

18 Powered man throws flint chips, calling upon them to kill animals.

19 Hero violates taboo. Calamity impends but hero overcomes.

20 Heroine kills pursuing monster by throwing boiling oil into its face.

21 Hero kicks over tree and causes skeletons to rise in flesh. Bones are mismated through haste. This is the explanation of the origin of cripples.

22 Hero or twin heroes walk into the ground and disappear.

23 Lonely bird sings for a mate. Various creatures seek to comfort the lonely bird but all are rejected until a natural mate calls and is found injured or trapped. He is released by the lonely bird who flies away with him.

24 Animals talk to men. Some animal warns hero of impending danger and plans escape.

Objects

1 *Dream helpers.* These are animals or persons that have come to the hero in a dream and promised to assist him in times of peril.

2 *Astral body.* The hero has an astral self that appears in times of great danger and points out a way of escape.

3 *Hollow log regeneration.* Hero who has been abused or conjured is regenerated by passing through a hollow log.

4 *Talking flute.* The flute kept in a "bundle" talks to the hero's friend and informs him of his condition, or it tells the hero where he may find game.

5 *Running moccasins.* Hero pursued takes off moccasins and orders them to run ahead and make tracks that baffle pursuer.

6 *Magic arrow.* An invincible arrow that kills whatever it is aimed at. It may be shot aimlessly into the air and game will return with it, falling dead at the hero's feet. No one but the hero can withdraw the arrow.

7 *Forbidden chamber.* A certain walled off part of the lodge is forbidden to the hero, who in older relative's absence explores it, causing anger of magical beings.

8 *Door flap action.* The sorcerer commands the hero to perform dream demand by going out of door and consummating demand before the door curtain flaps back.

9 *Magic fishline.* The sorcerer hooks the hero's fleeing canoe with a magical fishline. The hero burns off the line by emptying his pipe upon it.

10 *Hero ties his hair to earth.* When the hero suspects he is in the hands of a sorceress he ties a hair to a root before he sleeps. The sorceress makes off with him but can not go beyond the stretching length of the hair and is compelled to return.

11 *Lice hunting.* The sorceress hunts lice in the hero's head, lulling him to sleep.

12 *Saliva gives power.* If a powered being touches any object or weapon with his saliva, it takes some of his power.

13 *Wampum tears.* The captured hero or heroine, when tortured, sheds wampum tears which enemies greedily take.

14 *Magical animal skins.* The hero or sorcerer has enchanted skins which he can conjure to living animals. He may enter a skin and assume the characteristics of its original owner.

15 *Magic pouch.* The pouch of animal skin holds the hero's utensils, tobacco and pipe. It may be conjured to a living thing.

16 *Magic suit.* A self-cleaning suit that gives power to wearer.

17 *Magic canoe.* A canoe that has unusual speed and may be paddled into the air.

18 *Inexhaustible kettle.* The hero's friend puts scrapings of corn or nut into the kettle and it expands enormously supplying enough food. The hero tries the experiment and expands the kettle too greatly, bursting the lodge.

19 *Magical springs.* Springs that have been enchanted by sorcerers are the dwelling places of monsters that lure the unwary to drink. The monster then drags in his victim and eats him.

20 *Enchanted clearings.* Clearings guarded by monsters who prevent the hero from visiting the sorcerer living in a lodge within.

21 *Bark dagger.* The hero is incapacitated by thrust of bark dagger piercing his back. The villain steals the hero's clothing and impersonates him. See Impostor.

22 *Sweat lodge regeneration.* The hero recovers through a sweat of bear's grease. The lodge is covered with a fat bear pelt.

23 *Powered finger.* The hero has power to kill animals by pointing his finger at them.

24 *Animated finger.* The hero obtains a magic finger that stands in his palm, pointing out the location of anything he desires.

25 *Borrowed skin.* The hero borrows the skin (coat) of deer, mole, or other animal, and entering it, moves about without exciting suspicion of enemy.

26 *Borrowed eyes.* The hero borrows the eyes of deer or owl for a blind uncle enabling him to recover his own eyes or to see for a few moments a long lost relative, generally a brother.

27 *Stolen eyes.* Sorceresses rob young men of their eyes.

28 *Quilt of eyes.* Quilt made of winking eyes stolen from young

men who have looked at the witches who continually sew upon such a quilt.

29 *Girls in box.* Enchanted girls hidden in a bark box come forth upon demand of conjurer. The enchantment is not of an evil nature.

30 *Enchanted feathers.* These placed upon hero's hat give him great power, particularly for running.

31 *Enchanted birds.* The hero has enchanted birds upon his hat, that bring coals to light his pipe.

32 *Bark dolls.* Dolls are enchanted so that they speak for their maker, deceiving evil pursuer of hero.

33 *Talking moccasins.* Moccasins placed in lodge talk to evil pursuer, setting him or her astray.

34 *Reducible dog.* A tiny dog that is kept in a pouch. It may be enlarged to a size sufficient to carry the hero or his fleeing sister. Upon being patted with the hand or magic rod, it becomes reduced to a size almost invisible.

35 *Talking skull.* The hero finds the skull of his uncle. It asks him for tobacco and then shows him how to overcome sorcery.

36 *Flayed skin.* A human skin is the slave of sorcerers and guards their lodge, clearing or path, screaming out the presence of intruders. It may be revived by the hero who removes the enchantment.

37 *Wampum eagle.* An eagle covered with wampum. Many persons shoot at this eagle, trying to kill it. Only the hero can kill it with his magic arrow.

38 *White beaver.* A magical beaver, generally the "brother" of a witch, is killed by the hero who invites in his friends to help eat the beast.

39 *Blue lizard.* The lizard lives in a magic spring and lures the unwary to death by pulling them into the water.

40 *Flying heads.* These are spirits of the storm winds. They are generally evil characters in stories.

41 *Pygmies.* There are tribes of "little people" living underground or in rocky places. They have valuable charms and can be forced to give them to men. They have a ceremony in which they delight. If men beings perform this ceremony, favor is gained. They like tobacco and nail parings.

42 *Buffalo one-rib.* A magically endowed buffalo kills men. It can not be injured by arrows because it has only one rib, a bony plate protecting its entire body. It is vulnerable in the bottom of one foot.

43 *Fast-growing snake.* A boy finds a pretty snake and feeds it.

It grows enormously and soon eats deer. Game is exhausted and the snake goes after human beings.

44 *White pebble.* A white stone is given magical power and when thrown at a magical monster hits and kills it.

45 *Flesh-eating water.* The water of a magical lake eats the flesh from the bones of the unwary. Monsters living in it are immune.

46 *Sudden friend.* The hero in a predicament sees a strange person before him who announces that he is a friend and will help the hero escape. He tells the hero what to do.

Components of the Cosmological Myth

1 *Sky world.* A world above the clouds inhabited by transcendent beings.

2 *Celestial tree.* A wonderful tree in the center of the sky world.

3 *Sky woman.* She falls through hole made by uprooted sky tree and brings a promised child with her.

4 *Primal turtle.* He rises from the sea to receive the sky woman.

5 *Earth diver.* Animals dive to secure earth for turtle's back.

6 *World tree.* This springs up from the root of the sky tree brought down by the sky woman. It grows in the "middle of the world." Flowers of light.

7 *Female first born.* A daughter soon born to the sky woman. Grows to quick maturity.

8 *Immaculate conception.* Daughter conceives in mysterious manner.

9 *Rival twins.* Twins born to daughter. The warty, flint-hearted one kills his mother at birth. The fair one, the elder, watches her grave and finds corn, beans, squashes, potatoes and tobacco springing from it. The elder twin is constructive, the younger is destructive.

10 *Hoarded water.* The evil twin causes a great frog to drink all the water of the earth. The good twin hits it with a stone causing it to disgorge.

11 *Father search.* The good-minded twin searches for his father and finds him on a great mountain to the east.

12 *Son testing.* Good Minded's father tests him with wind, water, fire and rock. Good Minded proves his sonship and returns to the earth island with bags of animals.

13 *Man making.* Good Minded molds man from clay after reflections seen in water.

14 *Primal beings return.* Good Minded and grandmother return to sky.

15 *Evil banished.* Evil Minded is placed in an underground cavern.

THE STATUS OF THE NEW YORK INDIANS

BY ARTHUR C. PARKER

The uncertain legal status of the New York Indians of the Six Nations has been the cause of considerable confusion, not only to these Indians, but also to the various departments of the State. The result has reacted unfavorably upon the reservation Indians and has hindered their progress.

At a meeting of the New York State Indian Welfare Society at Syracuse in 1918, various state and federal officials who dealt with Indian matters were invited to submit their opinions as to how a remedy might be found and applied. It was suggested that a commission be appointed to consider the problem. Robert W. Hill of the State Charities Department was named to draft a bill seeking the appointment of a commission.

The bill was drawn and introduced, passing both houses of the Legislature and signed by the Governor, becoming chapter 590 of the Laws of 1919. After determining the membership of the commission the bill defines its duties as follows:

Such commission shall confer with the two committees on Indian Affairs of the United States Congress, whenever Congress shall be called into session by the President of the United States, and shall consider with such committees the relations and status of the Indians living on the Reservations of New York State, as they may be affected by the State of New York and the United States Government.

The Commission was appointed by the Governor and duly organized.

The commission was recognized by the Governor who appointed the individual members. A preliminary meeting was held in the office of the Speaker of the Assembly, Thaddeus C. Sweet, on July 9, 1919. At this session E. A. Everett was elected chairman, Loring S. Black, vice chairman, and A. C. Parker, secretary. The following members were present: Assemblyman E. A. Everett, Assemblyman Thaddeus C. Sweet, Assemblyman Peter McArdle, Assemblyman Dehart W. Ames; David R. Hill, Indian chief; Deputy A. F. Jenks representing the Attorney General; Senator Loring M. Black, Senator J. Henry Walters; Dr R. W. Hill, State Board of Charities; Dr Matthias Nicoll jr, Health Department; A. C. Parker, Education Department. James W. Yelverton and C. A. Donahue were absent.

After communicating with the federal authorities dealing with Indian matters and with the chairman of the two committees of Congress on Indian affairs, it was found impossible to secure a conference until after September 1919.

At a meeting of the commission held in the Murray Hill Hotel December 3, 1919, the commission appointed Chairman Everett, Robert W. Hill and A. C. Parker to visit the Washington authorities and discuss the subject of the legal status and condition of the New York Indians. The members so appointed went to Washington in January 1920 and visited the officials as directed.

Results of Conference and Visitation

No thoroughgoing conference could be held with the congressional committees in 1920, but valuable information was obtained. The committees placed in our hands several important documents relating to the New York Indians, notably Document 1590, H. R. 63d Congress, 3d Session, under the title Senecas and Other Indians of the Five Nations of New York, and known to the Indian Department as the Reeve's Report. This report recites the treaties and and court decisions relating to the New York Indians.

It was found that the federal authorities desired to cooperate with New York in the matter of clearing the New York Indian problem. A suit in the Supreme Court to determine in which body the wardship of the Indians of New York rested, was suggested. The question in Congress seems to be: Who is responsible for the New York Indians, and to whom shall they appeal for protection?

The Washington authorities were interested in the opinion of the Attorney General of the State of New York, rendered October 15, 1915, noted herein.

No other meetings with the committees of Congress were held and no information has been received from them. The state commission has sent the federal authorities no detailed information.

Joint Meeting with Federal Indian Commissioners

On July 27, 1920 the State Indian Commission held a joint meeting with the United States Board of Indian Commissioners at the United States Hotel, Saratoga Springs. The minutes of this meeting are a matter of record. In this meeting Secretary McDowell said:

Down in Washington they wonder what the commission is to do; whether they want the State of New York to have jurisdiction or not; whether New York wants the United States to assume com-

plete control or whether the State wants to continue in this work or go further than the Indian Office..... I don't care whether it is a bill in the Senate or the House, it will be referred to the Secretary of the Interior and he in turn hands it to the Commissioner of Indian Affairs. *I hear that they all keep away from the New York Indians* because they don't want them..... The only intention that the United States has is to carry out the treaties that they hold with the Indians of the State of New York.

Visit of Commission to Indian Reservations

On August 15th the commission met at the Onondaga Hotel, Syracuse, for the purpose of starting its visit to the New York Indian reservations. The object was to discover the actual legal, social and economic conditions on the reservations and to gain some idea of the needs of the Indian people.

As a result of this visit the commission saw that the New York Indians living on reservations had but one social and economic outlook—that toward the white man's world.

New York Indians

Dress like white men
Live in the same kind of houses
Eat the same kind of food, except a few native corn dishes
Use the same kind of tools and farming implements
Speak the English language
Read American newspapers and periodicals
Attend, when young, the same kind of schools as are prescribed for citizen children
Have a form of native government with native officers, and consider their reservations a restricted domain

New York State does for these Indians the following things:

It has provided thirty-four day schools under the Department of Education
It provides teachers and books for the Indian children
It has provided a splendid institution for the orphaned and for the children of the poor. This institution is the Thomas Indian School under the control of the State Board of Charities
It provides for cases of extreme poverty and for the hospital care of the poor sick
It encourages agriculture through the training of Indian children in the short courses at State College of Agriculture at Cornell University
It has provided for a system of visiting nurses and for sanitary inspection

In helping the Indians it is estimated that the State expends $150,000 each year, or $30 per capita.

The Indians of the State

Pay no direct land tax
Can not be sued in civil action
Have no jails
Have no public institutions
Have no national coinage
Have no custom houses
Have no criminal courts
Do not arrest or prosecute criminal Indians

In these respects they do not appear in any sense as "free and independent nations."

General Condition of Indian Tribes

As a result of this visit it was plainly seen by members of the commission who followed the survey, that the economic interests of these Indians are the same as those of the surrounding citizen population. Their modern social organization is patterned upon the same model. They have no special requirements other than those supplied by or to be found in our Commonwealth. It is not needful that wild game, wigwams, blankets, beads and memorial medals be supplied to them now as in days gone by.

The old day has passed and a new day has dawned for the Indian. In it he finds himself, in spite of himself, with a different outlook, in a different world, and moving toward a different goal, the same goal toward which the white man moves.

It is therefore needful that instead of presents of trinkets, that the State and the Nation supply the Indian with the means by which he can advance himself toward that goal, when he is unable to supply these things himself. This is simple justice to the Indian and a protective measure for the benefit of the citizen community.

In a broad sense, and without a spirit of cynicism, the Indian may be said to need the same things that the citizen community needs, and he must find the satisfaction of his needs in the institutions, customs and society of the civilized world.

In an economic sense the Indian has no racial separateness.

Tribal Rights of the New York Indians

By the Treaty of Canandaigua in 1794, the various nations of the Six Nations within the boundaries of the State of New York were recognized, and the lands reserved to these nations or tribes were

severally fixed and acknowledged. (Kappler, Laws and Treaties, vol. 1, p. 34.) Article 3 of this treaty reads:

Now, the United States acknowledges all the land within the above mentioned boundaries to be the property of the Seneca Nation and *the United States will never claim the same nor disturb the Seneca Nation nor any of the Six Nations* or their Indian friends residing thereon and united with them in the free use and enjoyment thereof, but it shall remain theirs until they choose to sell the same to the people of the United States who have the right to purchase.

The Treaty of Canandaigua of 1794 is considered a basic document in establishing the status of the New York Indian tribes, the Six Nations, and it has never been abrogated by Congress.

The Federal Government has always claimed control and guardianship over Indian tribes. By federal decisions it appears clearly that the Indian tribes, while maintaining their tribal organizations and residing on their reserved domain, by and with the consent of the Government, are regarded as wards of the Nation even when these reservations exist within the borders of a State. (Cherokee Nation v. The State of Georgia 5, Peters 1). In the language of the decision of the Court it was said: ". . . they may be denominated domestic dependent nations. They occupy a territory to which we assert a title independent of their will, which must take effect in point of possession when their right of possession ceases. Meanwhile they are in a state of pupilage. Their relation to the United States resembles that of a ward to his guardian. They look to our Government for protection; rely upon its kindness and power; appeal to it for relief from their wants; and address the President as their great father."

The State of New York does not and can not tax the Indians resident therein, for in the case of the Kansas Indians (5 Wall. 755) and the New York Indians (5 Wall. 761) the court said: ". . . but until they are clothed with the rights and bound to all the duties of citizens they enjoy the privilege of total immunity from state taxation."

In the case of United States v. Kagama, United States 375, Justice Miller in concluding his decision says:

The power of the General Government over these remnants of a race once powerful, now weak and diminished in numbers, is necessary to their protection as well as to the safety of those among whom they dwell. It must exist in that Government, because it has never existed anywhere else, because the theater of its existence is within the geographical limits of the United States, and because it has never been denied, and because *it* alone can enforce its laws on *all* the tribes.

Attorney General Woodbury (An. Rep't, 1915, vol. 2, p. 499) said:

If the Indian tribes are wards of the Federal Government and owe no allegiance to any state; and it the power over the Indian tribes rests with the Federal Government because it exists nowhere else: and if, from necessity, there can be no divided authority, then the jurisdiction of Congress must be exclusive.

Federal and state authorities agree that state laws do not apply to Indians living in their tribal relations. This doctrine is enunciated in the case of State v. Campbell, 53 Minn. 354, in which Judge Mitchel speaking for the court says, "It would never do to have both the United States and the states legislating on the same subject."

In the case of Peters v. Milan, 111 Fed. 244, the Court held:

That so long as the Indians retain their tribal relations and continue to be wards of the National Government, the control and management of them with respect to their tribal affairs is in the Federal Government, irrespective of the question of the title of the lands upon which, for the time being, they may be located.

From the facts of the case it appears that the Indians of the State of New York are living in tribal relations and that they maintain "governments" recognized by the state and the federal legislatures. That the State of New York has no jurisdiction over these Indians in the matter of enforcing state laws or of legislating for them is asserted in the opinion rendered in the case of United States of America ex rel. John Lynn against Frederick Hamilton and others, in a case of an alleged violation of the state conservation laws by Indians resident upon their reservations.

Title of the Indian to Lands and Territory

At the time of the European invasion of America in general, and of New York in particular, it was the common belief and practice by both Indians and whites that *land and territory might be taken by conquest.*

In America, Indian tribes took territory from one another just as the peoples of Europe did. The Iroquois who conquered much of the region now embraced within the boundaries of New York State took most of this land by conquest. They recognized title by conquest as well as by treaty. They even refused to allow their conquered wards, for example, the Delawares, to sell land to the whites without the permission of the Five Nations' Council.

It is true that the European colonists secured territory by any means within their power. What these colonists did is not of imme-

diate concern to us now. We are concerned with what took place after the Revolutionary War. After the establishment of the United States, the federal authorities sought to define the relation of the United States and of the Six Nations of Indians, one to the other. This was accomplished in the Canandaigua treaty of 1794, and this must be treated as a basic document and a starting point for any consideration of the legal status of the New York Indians, who are the descendants of the Five and the Six Nations.

In this treaty the United States acknowledges the lands reserved to these Indians, " to be their property."

This is apparently a recognition of the right of these Indians to hold their property as their own. Treaties made with the United States, subsequently modify the holdings of the Indians as outlined in the Treaty of 1794. Among these are the treaties of 1838 (known as the Buffalo Creek treaty), of 1842 (known as the Amended Seneca Treaty), etc.

It appears that by treaty and otherwise the land holdings of these Indians have been considerably diminished. In instances it appears that the people of the United States used undue pressure and influence to obtain treaties and signatures, but however this may be, the legal and land status of the New York Indians underwent a considerable transformation. Nevertheless, it appears that such lands as remained unsurrendered and unaffected by treaties later than 1794, still have attached to them the same protection as guaranteed by the Treaty of 1794, namely, that of being the sole property of the tribe occupying it.

Such lands as were acquired subsequently are subject to other conditions. For example, the Tonawanda reservation in Genesee and Erie counties was purchased by the Tonawanda band from a group of citizen American land owners. The title is by deed vested in the State of New York in trust for these Indians and the deed is deposited with the State Comptroller.

Lands Disposed of by the Several Nations

The Six Nations of the Iroquois was a society or confederacy of nations. Each nation was independent and self-governing during the period of aboriginal power. In all the laws of the Six Nations as a confederacy there is no item forbidding any of the component nations from acting independently in such matters as land sales.

During the entire period of dealing with the Six Nations each one of the six has been dealt with separately and this without the slightest opposition of the Six Nations Council. The Six Nations Coun-

cil never intervened and never interposed and never objected to any land cession by any one of the nations of the six for the reason that it never in all its history attempted to control the national affairs of any one of the several nations. The Six Nations as a government was a convention of a society or confederation of six nations met to discuss common customs and common welfare. The nations were allies in war, but each one of the nations might make war independently and the enemy was not to injure the nation not participating. They were allies in defensive measures against the white settlers, but at times the several nations were allies of different European nations. There was no unanimity even in this.

To say that any one of the Six Nations could not dispose of its holdings assured by the Treaty of Canandaigua is a fallacy. This very treaty assured and confirmed to each one of the several nations its national holdings. It did not confirm this to the Six Nations as a unit but to each of the several nations. The United States and the several nations of the six, have so construed this treaty and no objection has ever been raised.

The plain facts of history and of practice are that each one of the six nations was independent in its right to dispose of its lands to the people of the United States, and that the Council of the Six Nations never thought it a right or function to interpose.

To What Lands May the New York Indians Lay Claim?

From a study of the legal status of the New York Indians it appears that each Indian tribe or nation owns all such lands as the several treaties acknowledge to be theirs, subject to land cessions made subsequently to the signing of the treaties.

1 They own the land that they now occupy, but the title to this land through agreements and land sales, in some cases has undergone a change. This the courts have frequently stated. If court decisions in this matter are faulty, then the Supreme Court must be invoked.

2 They own or have other claim to all such lands as have been purchased or taken from them under whatever pretext or authority, if the conveyance of such land was not authorized, agreed to and sealed by the consent of Congress or by authorized representatives of the Federal Government. This position has been held by the United States Circuit Court of Appeals and has been followed by Judge Hazel.

The Attorney General's Opinion

(*See page 492 ff, Opinions, 1915*)

1 The Federal Government has always claimed guardianship and control over the Indian tribes.

2 The power of Congress to govern Indian tribes by legislation, and thereby to abrogate or supersede Indian treaties has been upheld by the Supreme Court.

3 The principle that a State may act in the absence of affirmative legislation on the part of Congress is not applicable to the government of tribal Indians.

4 Federal and state authorities hold that state laws do not apply to Indians living in their tribal relations.

5 Power to terminate federal guardianship of tribal Indians and to break up the tribal organization is exclusively in the Federal Government.

6 Conservation laws do not extend over the Indians residing in tribal relations upon reservations within the borders of New York State.

Growing out of this opinion the State authorities began to assume that the laws of the State, as well as the conservation laws, did not apply to the State Indians. The Indians themselves in instances began to affirm that state laws did not affect them.

It was found that the federal authorities thought in some instances that New York should be empowered to deal with her Indian population; others thought that the Federal Government should have the proper machinery provided for Indian administration in New York, but wished New York authorities to make suggestions.

Practical Considerations Concerning the Indian and the State

If, as has been contended by the New York Indians and by the Attorney General of New York, the Indians of New York are wards of the Federal Government and not of the State, then the Federal Government and not the State is charged with the duty of supplying the schools, institutions, relief for the poor and sick and other matters.

The Federal Government has not done these things and maintains that its sole duty is to carry out its treaty obligations.

The failure of the Federal Government ever to exercise the duties of guardian, save in cases involving land cessions and tribal autonomy, has made it necessary for the State during the past 100 years

to expend increasing amounts for the benefit of the Indians within her borders — and this under the impression that these Indians were wards of the State as well as of the Nation.

The Federal Government expends in fulfilling treaties and other obligations, $8949 annually for the New York Indians.

The State through the institutions and charities it supplies expends about $150,000 annually.

In administering these institutions the State is now denied the authority to enforce statutory regulations, and the Federal Government has neither conferred authority nor afforded any relief.

In matters of governmental oversight the State is now denied the right by the opinions of the Attorney General and some court decisions, to intervene on Indian reservations.

The imperfect tribal governments make it necessary and even imperative that life, liberty and the secure possession of property be safeguarded by an authority stronger than that supplied by the several tribes. Even here, while the federal authorities might interpose, they have not done so.

If the tribes are nations, they have no similarity to modern nations and do not function as such in their relations with the people of the State, save in denying the State the right to trespass upon their authority.

The chief authority for this assumed status of the New York tribes is based upon the Treaty of Canandaigua of 1794, ratified by the Senate in 1795.

It is a question worthy of some consideration whether or not the New York Indians, the Treaty of Canandaigua and the conditions surrounding the status of each and all have not undergone so great a modification that a *new consideration of Indian status is imperative.*

Are the Indians of the State of New York the Same People as When the Canandaigua Treaty Was Made?

It appears that our difficult position with relation to the Indians of the State has resulted from sweeping changes on the part of the Indians and of the citizen population.

No longer are these Indians living in bark wigwams or living the primitive life of the backwoods. Their economic and social life has undergone a profound change and they are today living the white man's life, the life of the average American. In this they are scarcely to be distinguished from the citizen population.

In blood these Indians have undergone a change. The numerous intermarriages of the whites with the Indians of New York have diluted the Indian blood until it is a question whether the average New York Indian has not at least three-eighths white blood. Many are half white or more, but the blood status is concealed under the belief that the child takes the blood status of the mother.

It thus appears that neither in needs and economic condition nor by blood are these Indians the same people or the same sort of people as those who signed the basic treaties more than a century ago.

This fact demonstrates, in view of the present complex condition of affairs, that there is need of a realignment of the whole situation in order that there may be a clear definition of the precise relations of the Indians and the Federal and the State Government, point by point and detail by detail.

All authorities who deal with the Indians agree that the *present situation is intolerable and leads to great injury to the Indians and to the detriment of the people of the State.*

This arises from the fact that the Indian governments are imperfect in themselves and still further restrained from functioning by the restrictions of federal laws and court decisions. It arises from the fact that the Federal Government holds that the New York tribes are federal wards, dependent nations, "distinct communities" of people "in a state of pupilage," and therefore restrained from the assertion of nationality to the extent of being forbidden to hold criminal courts or to apprehend criminals within their borders, and further forbidden to have any external foreign relations save with the people and Government of the United States. It arises from the fact that most public improvements and institutions are supplied by the State of New York.

All this is subversive of distinct and independent nationality and the mixture of authority prevents any adequate administration of the affairs of the respective tribes including the administration of justice. A tribal Indian can do all manner of injustice to his fellowmen on a reservation and suffer no legal consequences, save the possible feudal revenge of the injured party. This is demoralizing, and would be ruinous to the tribe if Indians as a rule were inclined to criminality, which fortunately, they are not.

Plainly, the strong, just hand of well-organized government is needed, but at every turn in this triangle each authority is restrained by the two other angles.

This is what constitutes the obstacle in the settlement of the legal side of the Indian problem. Both the State and the Nation must come to an agreement as to what authority shall prevail.

The Indians deserve a better legal environment. Small hope may be entertained for their healthy progress until the State and the Nation agree to face the situation. This the Federal Government has consistently refused to do, at the same time maintaining its supremacy. This position of the Federal Government has forced the State to exercise authority in certain matters and to extend to these Indians the benefits refused or denied them by the Federal Government, yet the Federal Government, the Indians and the courts have refused to allow the State to extend its laws along with its institutions.

Have the Several Tribes Yielded Their Sovereignty?

With the shifting of the economic outlook of the Indian from that of the frontier, of the hunting life and of dreams of an Indian State, the New York Indian has been compelled to face a changed world. He found that the material culture and social organization, as well as the legal protection of the white man's civilization, were things that he desired because they contributed to his survival.

The Indian asked for schools, and received them. The Indian, because of his primitive organization and poverty, was unable to provide schools, orphanages, criminal courts, sanitary inspection, public nurses, highways, asylums, hospitals, poor houses, agricultural instruction. The Indian in his primitive state did not need many of these things, having provided other means for taking care of them. But this is of the past; we are facing the present. Suffice it to say that the Indians in certain instances did ask for and receive, and that they now enjoy, the institutions enumerated.

Their people and their reservations benefit by these institutions. If the Indians have contracted for or paid for these benefits directly, they should be entitled to administer or participate in the administration of them, in accordance with laws and regulations agreed upon.

Having received these institutions and having accepted their benefits, it would appear that they must logically accept with them all the laws, regulations and administrative authority that goes with them.

In accepting a school or an asylum, it would appear that the regulative authority attached to the school and asylum or other institution or benefit, ought to be accepted. *The institution can not exist apart from the regulative authority that creates and supports it.* The two are coexistent and one can not be accepted without the other.

If the Indians had wished to deny the right of the State to exercise authority over health matters, agriculture, orphanages, charities and

schools, they should have refused these benefits and fought against them as trespasses. And, recognized, as being needed, the Indians should, themselves, have supplied these things. For many reasons they did not or could not do it.

In receiving these benefits of the State they tacitly accepted the regulative authority of the State, and though they now deny this in words, yet they affirm it in action by using and benefiting by these institutions. In fact, until recently, these Indians did not deny the right of the State to extend its laws in this direction, and the *State for 100 years legislated for them upon the assumption that it had a right to extend its laws where it extended its protection.*

Suggested Remedies

It will be seen from the foregoing facts that the situation of the New York Indians is complex, and that in view of the relations of the State to them, a conference with federal authorities is both necessary and imperative.

All persons dealing directly or indirectly with the New York Indians emphatically assert that something must be done immediately to prevent the demoralization of the Indians and the impairment of the rights of the State.

While the Indian Commission was not created to *determine* the status of the New York Indians, it was created to *confer* with the federal authorities, specifically the committees of Congress, with regard to this status. A determination of this status is immediately needful.

The Indian Rights Association, an organization of long and reputable standing, said in its Sixty-sixth Report:

To cure as far as possible the present evils of administration over New York Indians and to provide for a future equitable settlement, we submit that *sovereignty over them should be first determined by the Federal Court.*

The Secretary of the United States Board of Indian Commissioners, Malcolm McDowell, wrote:

The New York Indians are under the guardianship of the United States or they are not. There is one place in the whole world where definite and final answer to the question can be obtained and that is in the United States Supreme Court. What it might say will settle the question. Then when it has spoken and you know whether the United States or the State has jurisdiction you can go ahead on a practical program and help the Indians. Until that question is definitely and finally answered we will continue to run around in circles.

Judge Cuthbert W. Pound of the New York Court of Appeals writing in the *Columbia Law Review,* (February 1922), said:

The Nation owes a duty to its wards, if it continues to treat the New York Indians as such, either to enact a code of civil and criminal laws for the Indian reservations, or to subject them to state law, or to put an end to the tribal relations and leave the State supreme over the individual Indians as it alone has power to do. (Heckman v. United States). *The power of Congress over the tribal relations of the Indians and the Indians themselves is said to be a political one, not subject to control by the courts, and it is held in authoritative cases that until Congress declares that Government guardianship over the Indians shall cease, its full and exclusive legislative power over them continues.* This power rests not on any specified grant of legislative authority, but on the implied authority which subjects the conduct and property of dependent persons within the jurisdiction to governmental tutelage. (Lonewolf v. Hitchcock, 1903, 187 U. S. 553, 565, 23 Sup. Ct. 216). It would follow that such power is paramount to treaty or state law.

From the above opinions it would appear that there are three possible solutions of the New York Indian problem, namely:

1 A determination of the status of the New York Indians by the Supreme Court of the United States, the case being adjudged upon the rights and disabilities of these Indians as guaranteed by legislation and treaty; or

2 A declaration of status by congressional enactment, said declaration being based upon present needs, circumstances and conditions, together with a consideration of the changes that have come over the country and over the Indians during the last century. A congressional declaration would ignore perhaps existing laws and treaties and give the case an entirely new alignment.

3 An act of Congress delegating to the State of New York authority to act as its agent in civil and criminal cases arising from violations of state and federal laws and regulations on the several reservations, but not binding the State to federal treaty obligations or annuity payments charged to the Government.

There are several methods by which the State can force Congress to act. If the Indians of the State are the wards of the Federal Government, then New York could make the following requests of the Federal Government:

1 Request the Federal Government to supply the schools, teachers, asylums, poor relief, roads, agricultural help and public health provisions, now supplied by the State, at the same time notifying the Federal Government that the State ought not to be expected or required longer to care for federal wards.

2 If the Federal Government wishes, however, that New York continue this work, then Congress should pass an act giving New York authority to enter the reservations and maintain such benefits and institutions. The Federal Government and the Indian tribal governments place the State in an anomalous and well-nigh impossible situation when each expects New York to provide the benefits of civilization for these Indians, to place the institutions and improvements of the State on the reservations, and then forbids the State the right of exercising jurisdiction over the Indians so benefited.

New York State is entitled to relief, and the Indians are entitled to better treatment. These Indians should no longer be compelled by the *laissez faire* attitude of Congress to be the prey of continual uncertainty and conflicting authorities.

It is therefore recommended that the Legislature of New York through the Attorney General and representatives of each State Department having relations with the Indians of the State, make a request to the Federal Government that Congress provide by the enactment of law a declaration of the status of the New York Indians, such declaration to be preceded by a suit in the Supreme Court of the United States for the purpose of determining the legal status of these Indians in accordance with existing laws and treaties. Even without this decision in hand Congress may easily declare the status of these Indians in accord with the joint interest of the people of the State surrounding them, and the Indians themselves.

The logical supervision of the New York Indians is by the State, but as court decisions seem to determine that this supervision rests entirely with the Federal Government, it would appear that the Federal Government should exercise its legal supervision, and no longer, with apparent apathy, neglect and even refuse to do so. Continuing to fail, the Federal Government should empower the State to deal legally with its logical right.

The foregoing observations are submitted in discharge of my duties as secretary of the commission and as the representative of the State Department of Education. It is believed that some of these facts and conclusions ought to be considered in drawing up recommendations for the untangling of the involved legal status of the New York Indians.

Indeed these statements were brought to the attention of the various members of the commission, the Speaker of the Assembly, the Attorney General and Assistant Attorney General A. F. Jenks and other interested parties, in anticipation of the meeting of the Indian Commission at which the commission's report should be adopted.

No meeting of the commission was ever called by the Chairman of the Commission for the purpose of discussing a report to the Legislature, though the members were unofficially informed that the chairman was drafting a report of his own which he wished the members to sign. The members of the commission anxiously awaited a call for the purpose of considering and debating upon a report, but up to the last day of the Legislative session no such meeting was called, though it would seem that it was the plain intent of the Legislature in creating the commission and the Governor in appointing it, that such a report should be the result of joint action and mutual consideration.

Inasmuch as the life of the commission has now expired and the possibility of submitting a report and argument to it has passed, this copy of the proposed argument of the representative of the State Department of Education, is published as a record, for the benefit of those who are interested in the legal status of the New York Indians and in establishing the means by which the reservations may be protected and governed.

A FOSSIL SPECIES OF CADDO (OPILIONES) FROM THE BALTIC AMBER, AND ITS LIVING RELATIVES

BY SHERMAN C. BISHOP AND C. R. CROSBY

Caddo is a rather aberrant genus characterized by the greatly enlarged eyes and is represented by only two very rare living species restricted so far as known to the eastern United States and Canada. It was therefore of great interest to find that an undoubted representative of the genus was described by Koch and Berendt (Die im Bernstein organischen Reste. v. 1, pt 2, p. 101, pl. 15, fig. 125. 1854) from the early Tertiary Baltic amber under the name of Platybunus dentipalpus. This should be transferred to the modern genus Caddo.

Through the kindness of Dr Walther Horn and the authorities of the Berlin Museum, we have had the opportunity to study the type specimen of Caddo dentipalpus and have had a new figure prepared. It is very closely related to C. agilis. The eyes are relatively as large as in that species and the eye-tubercle is of the same form. The eye is surrounded by a dark ring. The segments of the body can be distinctly seen and are much the same as in C. agilis. Only the first and the basal part of the second segment of the chelicerae are visible and appear unarmed. The palpus is nearly unarmed on the dorsal and outer surface but on the inside there is a bunch of stiff hairs at the tip of the femur (on a distinct swelling) and the inner surface of the succeeding segments is densely clothed with similar hairs. The underside of the femur bears three spines arranged almost the same as in C. agilis. The legs seem to be longer than in that species.

The treatment of the genus Caddo in Roewer's excellent revision of the Opiliones Palpatores, part 2 (Abhandl. a. Gebiete, Naturw. Hamburg, v. 20, Heft. 1 p. 33, 1912) is unsatisfactory due to no fault of the author.

Banks described the type species, C. agilis, (Proc. Ent. Soc. Wash., 2:249, 1892) from immature specimens but did not mention the fact. Crosby (Jour. N. Y. Ent. Soc., 12:253, 1904) described two species which he referred to this genus, glaucopis and boopis. In the same number of this journal, page 256, Banks published a note stating that the original description of agilis was based on immature specimens. A comparison of specimens later showed that agilis and glaucopis are the same. Crosby (Ent. News, 18:161, 1907) published a note to this effect. Roewer overlooked this publication and retained glaucopis as a distinct species.

This is not the worst. By an unfortunate typographical error the drawing of the palpus of boopis was attributed to glaucopis in the original description of the species, although the copy submitted to the editor was clear. This error was unknown to Roewer and he has copied (pl. 1, fig. 3) the drawing of the palpus of boopis and attributed it to glaucopis. Misled by this drawing, Roewer erred in constructing his table to the species. It should read as follows:

Femur of palpus armed with three large spines near base.
agilis Banks (glaucopis Crosby)

Femur of palpus armed with two spines near base and one toward tip. boopis Crosby

C. boopis was based on three specimens from Ithaca, N. Y. In spite of intensive collecting in New York and Missouri since that time no more specimens were secured until the summer of 1923 when Miss A. Wolf collected eight specimens of both sexes at Ballston Lake, Saratoga county, N. Y., August 5th and 15th, by sifting under pine trees. On August 30th, three additional specimens were secured at Voorheesville, N. Y., also by sifting pine needles.

The drawings were made by C. H. Curran and W. J. Schoonmaker.

EXPLANATION OF PLATE

[85]

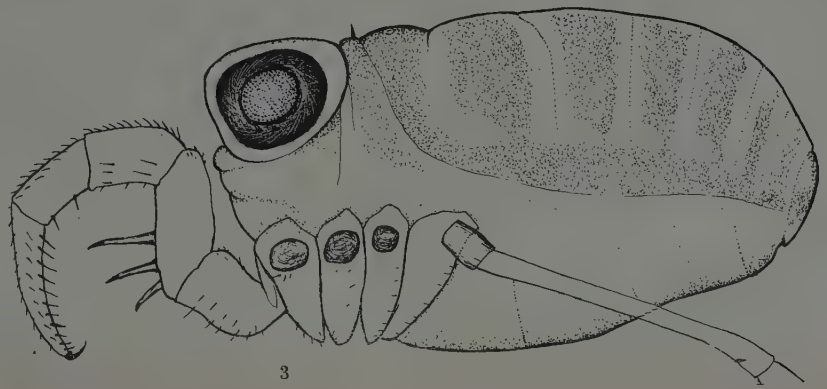
Fig. 1 Caddo dentipalpus Koch and Berendt. Side view of specimen from the Baltic amber. Note the three large spines on the lower side of the femur of the palpus and the spinose hump near the tip on the inner side. Drawn by W. J. Schoonmaker.

Fig. 2 Caddo boopis Crosby. Side view of female with ovipositor exposed. Actual size 1mm. The drawings of C. agilis and C. boopis are made to the same scale and show the relative size of the species.

Fig. 3 Caddo agilis Banks. Actual size of specimen about 2mm. The spines on the lower side of the femur of the palpus are confined to the basal half as in Caddo dentipalpus. Caddo dentipalpus is about the size of Caddo agilis.

1

2



3

NOTES ON SALAMANDERS

BY SHERMAN C. BISHOP

The collections on which these notes are based were made during a short trip in October 1923, in the Blue Ridge mountains of western North Carolina. A few additional notes and photographs put on record the results of a half day's collecting in the vicinity of Raleigh in company with C. S. Brimley and W. B. Mabee of the Division of Entomology, North Carolina Agricultural Experiment Station.

Although the trip was undertaken primarily for the purpose of collecting arachnids, the localities chosen for exploration included some that have long been of great interest to herpetologists. This was the case when we collected along the Yonahlossee road between Blowing Rock and Linville, on the southwestern slopes of Grandfather mountain, and finally when we visited Mount Mitchell, Mount Pisgah and some of the foothills near Black mountain.

In one of the several streams which rise on the southern slopes of Grandfather Mountain and cross the Yonahlossee road, Dr J. Percy Moore found the specimens to establish the genus Leurognathus.[1] In this locality, probably in the stream visited by Moore, we found our first specimens of this interesting salamander in the pool at the foot of a small waterfall. Here, too, were many specimens of Desmognathus quadra-maculatus and a few of Desmognathus ochrophaeus carolinensis.

When encamped on the southwestern slope of Grandfather mountain, collections were made in the small streams that rise in the cold springs near the summit, and under logs and stones both in the open and in the forest. On Mount Mitchell, Steprock creek at about 6000 feet furnished most of the specimens of Gyrinophilus danielsi and Eurycea bislineata wilderae taken on the trip. Other places visited were Minehole Gap, Buncombe county, Montreat, and Stoney mountain near Hendersonville.

The exceedingly dry weather which prevailed for a month before we reached the mountains and continued during the greater part of our stay, accounts in large part for the scarcity of some of the terrestrial salamanders commonly found in this region. Neither Plethodon yonahlossee nor P. metcalfi were taken, although the former is reported by Dunn[2] and the latter by Brimley[3]

[1] Proc. Acad. Nat. Sci. Phila., 1899, pt 2, pp. 316-323, pl. 14, figs. 1-11.
[2] Bul. Amer. Mus. Nat. Hist. 1917, 37:602.
[3] Proc. Biol. Soc. Wash., 1912, 25:139.

as abundant on Grandfather mountain. If these species have the same habits as Plethodon glutinosus, which burrows deep in dry weather, they could scarcely be found in numbers after such a protracted drouth as that of the fall of 1923. On the other hand, streams of considerable size had so shrunken that the aquatic forms were concentrated and more easily found.

During the trip I was fortunate to have, as traveling companions, Professor and Mrs C. R. Crosby of Ithaca, N. Y., and Mrs S. C. Bishop, all of whom, at various times, helped in the hunt for specimens.

Triturus viridescens viridescens (Raf.)

One specimen, land form, Raleigh, October 26th.

Ambystoma opacum (Gravenhorst)

Pl. 1, figs. 1 and 2

Walnut creek bottoms, Raleigh, October 26th. Six specimens including two females with eggs.

The two females were found, hiding with their eggs under masses of rotten wood and the débris left by flood waters of Walnut creek. The egg masses contained respectively 102 and 73 eggs with well-developed embryos. They were kept in the laboratory in damp earth and leaves, but showed no signs of hatching until placed in water late in the afternoon of December 6th. The following morning many had escaped the egg envelops and others were in the process of hatching. In hatching, the embryo breaks out, leaving a ragged, or in some cases, a roughly crescentic opening with the inner envelop protruding. The separate envelops often retain the position they had before the larva escaped and the inner one with its surrounding layer of clear jelly may be removed from the stronger, outer covering.

When first hatched the larva is somewhat pigmented, but the general color rapidly darkens after exposure to the light. A larva immediately after hatching is marked above with small black flecks of pigment on the head and on the back, except on each side of the mid-dorsal line, where there are a few small rounded or oval light areas. The tail fins and sides are mottled with yellow areas where the pigment is lacking. The balancers were all lost before hatching in the specimens here considered.

The emergence of the larvae was, in some cases, coincident with the release of small nematodes, apparently from the jelly layer be-

tween the two egg envelops. The parasites were a little over a quarter of an inch long, colorless and quite active. They seemed to have no effect on the larvae that hatched, but may have occasioned the death of many individuals that failed to develop.

Plethodon cinereus (Green)

Grandfather mountain, October 11th–12th, at about 4000 feet. Twenty-two specimens, representing both color phases.

Plethodon glutinosus (Green)

Grandfather mountain, October 12th, (4500 feet) two specimens; Mount Pisgah, October 19th, (3000 feet) five specimens; Oteen, October 16th, one specimen; Minehole Gap, October 17th, two specimens; Stoney mountain, October 18th, three specimens; Walnut creek bottoms, Raleigh, October 26th, one specimen.

Gyrinophilus danielsi (Blatchley)

Pl. 2, figs. 1 and 2; Pl. 3, fig. 3

Steprock creek, Mount Mitchell, October 21st–22d (6000 feet and above). Seventeen adults, four large larvae, thirteen smaller larvae of which twelve were hatching when found; Mount Mitchell, 4500 feet, one adult; Grandfather mountain, October 12th, (4000 feet) one adult; Stoney mountain, October 18th, (2500 feet) three large larvae.

This species has been regarded as one of the rarer salamanders of the southeastern states. Most of the specimens mentioned in literature and referred to this form have been collected below 3500 feet and are comparatively small and slender. Seventeen adults from Mount Mitchell taken at an elevation of 6000 feet or higher vary in length from 120–204 mm and average 155.5 mm. Eleven of the seventeen specimens (those 150 mm and over) average 168.6 mm.

C. S. Brimley has supplied me with a specimen and with the measurements of other individuals taken at altitudes much lower than that given above. I have also a single adult, 143 mm long, from Mount Mitchell taken at about 4000–4500 feet and one 122 mm long from Grandfather mountain at 4000 feet. Mr Brimley's specimens came from Sunburst, Cane river and Cowee mountain, N. C. and measure respectively 125, 127 and 107 mm in length.

The specimens from the summit of Mount Mitchell agree with Blatchley's description, particularly in size and in the mottling of

the throat; some individuals vary from the type in the following particulars. The pigment spots on the back may be large and close together, sometimes coalescing along the mid-dorsal line to form irregular V-shaped marks; or small, very numerous and regularly spaced; the entire ventral surface may be more or less conspicuously pigmented. These are probably variations due, in part, to age. On the other hand, the specimens collected at lower altitudes in North Carolina present certain characters which may prove of subspecific value when a larger series is available for comparison. These characters may be summarized briefly as follows: The average size is considerably below that of the high mountain forms; the underparts, including the throat, are entirely lacking in pigment, the lower lip only being narrowly margined; the sides of the head below and in front of the eyes are less strongly pigmented and finally, the tail is usually less pigmented distally, particularly on the lower half of the sides. As mentioned above, all adult specimens from the summit of Mount Mitchell are pigmented below, the extent apparently depending on the age of the animal. The larger specimens from lower altitudes are certainly mature and exceed in size the smaller individuals from higher levels but lack entirely the pigmentation of the venter.

The specimens collected on Mount Mitchell were found by turning the large flat stones in the bed or along the margins of Stephrock creek. On the morning of October 22d I was fortunate to find a large female guarding her young which were just ready to hatch from the gelatinous envelops attached to the under side of a large stone in comparatively still water. The eggs had apparently been attached separately when laid, like those of Eurycea bislineata, but at the time of discovery, disintegration of the gelatinous coverings and absorption had so far advanced that an area about 7 by 8 inches was entirely covered by a thick layer of jelly. Close examination showed that the individual larvae were inclosed by envelops one-half to three-quarters of an inch in diameter. A dozen larvae were collected as they wriggled out of the jelly mass and made their way into the water.

A newly hatched larva is slender and delicate with a ground color of pale lavender marked with small flecks of light yellow. A narrow median line slightly darker, extends from the head to the hind legs. The head is somewhat darker than the body and marked above with an indistinct Y-shaped mark which originates at the back and sends a branch to each eye. The eyes are black and apparently not completely functional; the lips are well formed. A definite

line separates the color of the back and sides from the venter which is pale yellow, colored by the yoke. The legs are pale and in life translucent as they are in the more northern relative Gyrinophilus porphyriticus. The color of the back and sides of both the larvae and adults of G. danielsi differs from G. porphyriticus in being speckled or spotted rather than faintly reticulated. The average length of nine larvae is 25.8 mm.

In view of the fact that the larvae were found hatching in late October, it might be supposed the normal egg-laying period of the species is in September. I am not at all convinced that this is the case. The waters of Steprock creek, particularly near the source of the stream above 6000 feet, are not subject to extreme changes in temperature during the different seasons of the year and it is more than probable that the breeding season extends over a period of several months. At lower altitudes the conditions are different and the breeding period may well be restricted.

Pseudotriton montanus (Baird)

Walnut creek bottoms near Raleigh, October 26th. Eight specimens.

Pseudotriton ruber ruber (Sonnini)

Bridgewater, October 14th, one adult; October 23d, three larvae.

Eurycea bislineata (Green)

Bridgewater, October 23d, a single larvae 39 mm long.

Eurycea bislineata wilderae Dunn.

Montreat, October 16th, one; Mount Mitchell, October 21st (6000 feet) seventeen; Mount Mitchell, October 21st, (4500 feet) five; Grandfather mountain, October 12th (4500 feet) three; Stoney mountain, October 18th, one.

Extremely abundant in Steprock creek but agile and difficult to capture. Sometimes as many as a dozen individuals beneath a single small stone at the edge of the stream.

Eurycea gutto-lineata (Holbrook)

Bridgewater, October 14th, four, October 23d, one female; Minehole Gap, Buncombe county, October 17th, one seen; Walnut creek, Raleigh, October 26th, one.

All the specimens captured were adult and a rather large female had well-developed eggs in the ovaries. With two exceptions the specimens were found under boards by the side of a small spring run in company with Desmognathus fuscus auriculatus.

Desmognathus fuscus auriculatus (Holbrook)

Bridgewater, October 14th, six; Walnut creek, Raleigh, October 26th, six.

Desmognathus ochrophaeus carolinensis Dunn

Pl. 3, fig. 4.

Yonahlossee road between Blowing Rock and Linville, October 10th, several specimens; Grandfather mountain, October 11th–12th, (4000 feet) forty-two; at 4500 feet, thirty-five; Oteen, October 15th, three; Minehole Gap, Buncombe county, October 17th, five; Montreat, October 16th, one; Mount Mitchell, October 21st, (5500 feet) 55 transforming larvae, ten adults; Mount Mitchell, October 22d (6000 feet) five; Bridgewater, October 23d, three; also one specimen from spring near summit of Mount Mitchell, probably the type locality of the subspecies and two specimens from Blowing Rock taken September 14, 1921 and presented by Dr A. H. Wright of Ithaca, New York.

In color and markings one of the most variable salamanders. It is also one of the most abundant forms in the Blue Ridge mountains and may be found not only in and along the streams but under stones and logs on the mountain sides and in the trails where there is slight evidence of moisture.

The larvae of this species have not before been reported. They were found on the wet sand beneath a large flat stone by the side of a small spring run at an elevation of about 5500 feet. Under the same stone were several full grown specimens, dark and without definite color markings but clearly this species. No other species were found at the spring.

Ten larvae have an average length of 18.6 mm but vary from 15 to 23 mm. In spite of the difference in size, the specimens were probably of the same age when taken, for gill reduction had advanced to the same degree in all. Some individuals in color and markings are remarkably like larvae of Desmognathus fuscus of the same size, but others, even in this early stage, give intimation of the variability of markings found in the adults. Thus the dorsal unpigmented light areas may either be separated to form two distinct rows or coalesced with the median dorsal line to form a single, broad band with irregular edges; in other individuals the light areas unite with a very narrow median line to form a series of short cross bands connected in a chainlike pattern and margined along the sides by black. The light areas are sometimes opposite, more often alternating and united in a zigzag band.

The sides of the body and tail and the legs above are rather uniformly mottled with pigment, the interspaces being dull yellow. The lower half of the sides in some specimens, however, is more strongly pigmented and in strong contrast with the immaculate venter. The tail above, particularly the distal half, is slightly keeled as in larvae of D. fuscus. There are no striking differences in the body proportions of the larvae of this species and of D. fuscus but the head seems to be somewhat broader in the latter. Where the ranges of the two species overlap, it may be impossible to separate the young larvae except by the amount of the gill reduction for a given size. In the larvae here considered the gills are reduced to short stubs which are pigmented and bear two or three unpigmented terminal filaments.

Desmognathus phoca (Matthes)

Grandfather mountain, October 11th-12th, (4000 feet) ten; Swannanoa Gap October 14th, three; Montreat, October 16th, seven; Stoney mountain, October 18th, seven; Mount Pisgah, October 18th, one.

Several examples of this species strongly resemble, superficially, Leurognathus marmorata Moore. They have the same light buff ground color on the back and these light areas are more or less separated by darker pigment. The difference in pattern lies in the greater development, in Leurognathus, of the dark pigmented areas which are disposed in rather large blotches alternating with the buff patches; in D. phoca the dark pigment rather narrowly surrounds the light areas as indicated in Dunn's figure[1].

Old and dark individuals are rather hard to distinguish from certain specimens of D. quadra-maculatus, especially when the dorsal pattern has been obliterated and the venter becomes well pigmented.

Desmognathus quadra-maculatus (Holbrook)

Grandfather mountain (southwest side) October 11th-12th, (4000 feet) ninety; at 4500 feet, five larvae; Mount Mitchell, October 21st, (4500 feet) ten; at Camp Alice (6000 feet) five; Montreat, October 16th, eleven; Stoney mountain, October 18th, six; Swannanoa Gap, October 14th, five.

Any stone or stranded log in the mountain streams may furnish a hiding place for one or more specimens of this salamander. They

[1] Bul. Amer. Mus. Nat. Hist., 1917, pl. 58, fig 4.

are eminently aquatic, but have the peculiar habit of rushing out of the water and up the sides of stones or the stream bank when disturbed. Probably half of the specimens collected and most of the larger ones, were taken as they left the water. In life they may be associated with the smaller Desmognathus phoca and D. ochrophaeus carolinensis although the latter species are also found in situations that do not prove acceptable to D. quadra-maculatus. Some of the larger females had well-developed eggs in the ovaries but others had apparently deposited the season's complement. The ovarian eggs from two specimens dissected numbered respectively 52 and 49, and were about 3¼ mm in diameter, yellowish white and unpigmented.

So little has been published concerning the food of this species that it may be of interest to tabulate the results of the examination of the stomach contents of five specimens.

1 A half grown salamander (Plethodon).

2 One phalangid, Sabacon cavicolens, one adult stonefly and one insect larva.

3 A large hairy caterpillar and part of beetle.

4 Three flies, one hairy caterpillar, one stonefly nymph, part of a beetle, several hemlock leaves.

5 Three small salamanders, parts of two beetles, two adult wasps (Vespa), one jassid, one ant, several hemlock leaves and many insect wings, legs and fragments.

Leurognathus marmorata Moore

Pl. 3, figs. 1 and 2

Yonhalossee road between Blowing Rock and Linville, N. C., October 10th, three adult specimens; southwest side Grandfather mountain, (4000 feet) October 12th, two adults.

The first specimen of this interesting species was revealed when Mrs C. R. Crosby turned over a flat stone in the bottom of the small pool at the foot of a waterfall. Two other specimens were found in the same pool within a few minutes. The behavior of a specimen exposed to light by the removal of the stone under which it is hiding, is strikingly different from that of Desmognathus quadra-maculatus or Desmognathus phoca which may be living in the same stream.

The highly protective color pattern of Leurognathus, which is of course effective only while the animal is motionless against a pool-bottom background of gravel or small stones, is doubtless responsible for its sluggishness. The pattern is essentially

that of the darter and other small fish which forage over gravelly bottoms. When exposed by the turning of a stone, scarcely an attempt was made to escape and all specimens found were simply picked up by hand and transferred to the collecting bag. They could be induced to swim, but the process was a leisurely one and lacked entirely the vigor shown by D. quadra-maculatus or D. phoca.

The first three specimens taken were found in the pool which, I believe, is the one that furnished Dr J. Percy Moore with the specimens upon which he based the genus. Two other specimens were taken in a small stream on the southwestern side of Grandfather mountain. Here they were hiding under stones with D. quadra-maculatus but not in pools, probably because the protracted drouth had reduced their living quarters. Following the suggestion of Dr E. R. Dunn,[1] that the species is an inhabitant of large streams, I spent considerable time turning stones and examining possible hiding places, but without results. From my experience with Leurognathus, I am inclined to believe that it will be found in numbers in the streams of Grandfather mountain if the collector who seeks it will devote his time to the pools and not give too much attention to the capture of the ever present and exceedingly active Desmognathus quadra-maculatus.

Specimens are so rare in collections that it seems worth while to add some measurements and notes on variations in color patterns.

A female 103 mm long has a tail length of 40 mm when measured from the posterior end of the vent. The venter is uniformly and lightly pigmented except for a narrow area on each side of the impressed midventral line of the belly, and a spot on the throat. The soles of the feet are considerably darker than the rest of the legs with the tips of the toes black. The sides of the body and tail are brown with light areas in evidence only on the upper part. The light buff areas on the back are mostly confined to the trunk and the base of the tail which leaves the distal half of the tail and head much darker. There are thirteen costal furrows. This female had twenty eggs in the right ovary and fourteen in the left. Their small size (1.6 mm in diameter) indicates that they have not reached full development. The eggs are unpigmented and yellowish white.

A larger female, 116 mm long, has the same general color pattern but the venter is more uniformly pigmented and the dorsal light areas extend on the head. This specimen had fourteen eggs in the right ovary and twelve in the left.

[1] Proc. U. S. Nat. Mus., 1917, 53:42.

A specimen 103 mm long, which I believe is a male differs from the others in having the venter very dark except for a narrow spot in the middle of the belly. The two other specimens measure respectively 90 and 104 mm. The larger is light buff above with alternating patches of darker pigment on the back and tail; the venter is free from pigment except along the sides.

ADDENDA

Plethodon metcalfi Brimley. Four speciments, all less than half grown, were overlooked in a series of dark colored Plethodon cinereus from Grandfather mountain October 11 and 12, 1923.

EXPLANATION OF PLATES

Plate I

Fig. 1 Male Ambystoma opacum Gravenhorst. The light areas in the male are clear white, while in the female they are either grayish or bluish white.

Fig. 2 Female Ambystoma opacum Gravenhorst. The eggs, which are deposited in the fall, are usually placed in situations that later will be well watered. The embryos may remain in the eggs, which are deposited in the fall, are usually placed in situations placed in water. Both sexes photographed in the field at Raleigh, N. C., October 26, 1923.

Plate 1

Plate 2

[99]

Fig. 1 Gyrinophilus danielsi Blatchley. Female from Camp Alice, Mount Mitchell, N. C., taken Oct. 22, 1923 at an altitude of 6000 feet. This female, which was found with her hatching young beneath a large flat stone in Steprock creek, was 204 mm in length. Photograph of living specimen in water.

Fig. 2 Ventral view of the same specimen to show the color pattern of the throat and belly. Photographed in the office of the Zoologist by E. J. Stein.

Plate 2

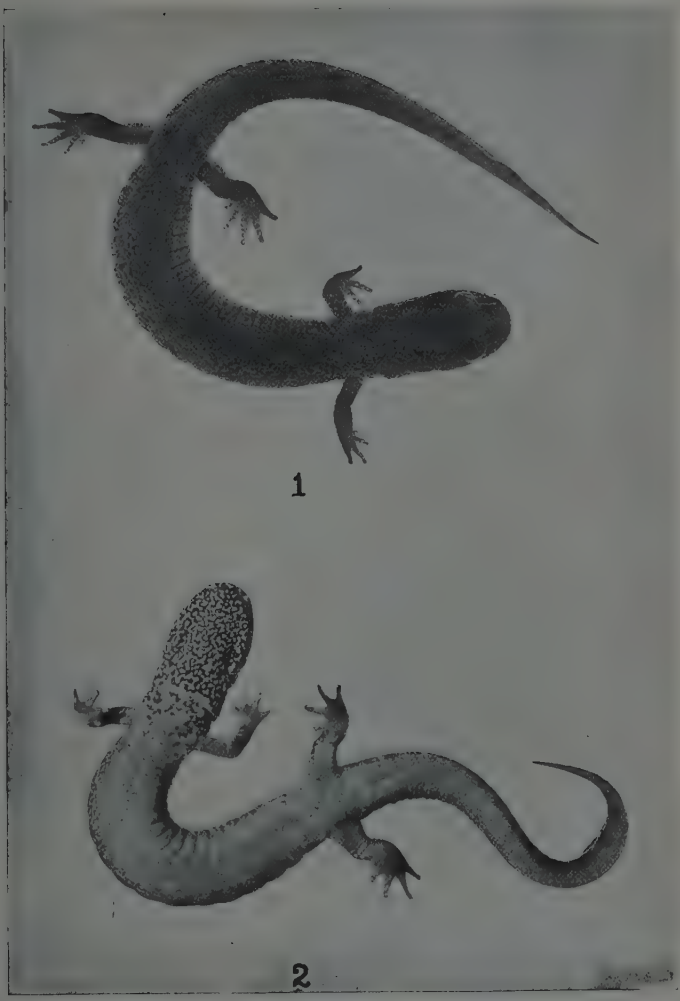


Plate 3

[101]

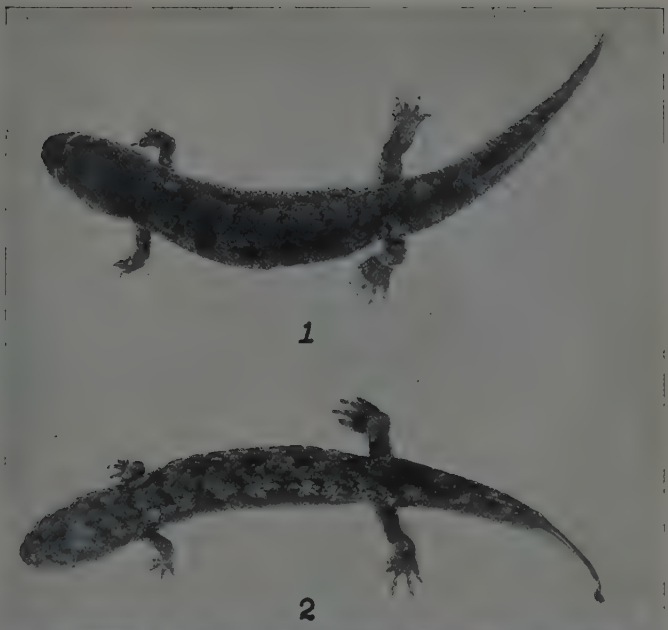
Fig. 1 Leurognathus marmorata Moore. A female photographed after being in formalin solution for several weeks. Locality: southwest side of Grandfather mountain, N. C. Oct. 12, 1923, 4000 feet altitude. Photographed by E. J. Stein.

Fig. 2 Leurognathus marmorata Moore. (male) Note the slimmer lines and more definite color pattern. Locality: southwest side of Grandfather mountain, N. C. Oct. 12, 1923, 4000 feet altitude. Photographed by E. J. Stein.

Fig. 3 Larva of Gyrinophilus danielsi Blatchley, about twice natural size, photographed in the jelly mass in which it was found.

Fig. 4 A half grown specimen of Desmognathus ochrophaeus carolinensis Dunn, photographed in the field. In life, the light areas on the back were a bright red and the interspaces bronze and gold. South slope of Grandfather mountain, N. C. Oct. 10, 1923.

Plate 3



ONTARIO COUNTY PLACE NAMES

PREPARED BY CHARLES F. MILLIKEN

A

Academy Tract. Tract of 3000 acres in southern part of Canandaigua township, given by Oliver Phelps in 1804 to aid Canandaigua Academy

Allen's Hill. Hamlet in town of Richmond. So named from Moses Allen, the first white settler, 1796

Aloquin. Station on the Pennsylvania railroad in town of Hopewell. Formerly known as Lewis Station and as Ennerdale. The name is a shortening of the Indian name Algonquin

B

Bald hill. An eminence between Canadice and Hemlock lakes.

Baptist Hill. Hamlet in town of Bristol, where a Baptist church was organized in 1805

Bare hill *or* **Nun-da-wa-o** (Indian for Great Hill). The eminence on the east shore of Canandaigua lake from which, according to legend, the Seneca Indians had their origin. So named because of its bare crest

Beaver creek *or* **Trap brook.** Stream in town of Farmington

Black brook. Stream in town of Farmington. It flows over black shale rock

Boswell Corners. In town of South Bristol, named after Joseph Boswell who came from Maine between 1817 and 1820

Boughton hill. Eminence in town of Victor, west of Victor village, site of Indian village of Gannagaro destroyed by Denonville in 1687. Named from the Boughton family, first settlers

Bristol. Town, named after Bristol, Conn., from which many of the early settlers came

Bristol Center. Hamlet in town of Bristol

Bristol Springs. Hamlet in town of South Bristol, formerly known as Cold Springs. So named on account of presence of flowing spring of cold water

Brown Stand. Site of first tavern in town of South Bristol, owned and conducted by Allen Brown

Brownsville. Hamlet in town of Farmington named after three brothers, Rial, Nathan L. and Nicholas Brown, purchasers of a large tract of land in the neighborhood

Burning spring. Natural gas spring near hamlet of Bristol Center on a small brook that empties into west side of Ganargua or Mud creek, visited by La Salle in 1669

C

Canadice. Town, formed under this name in 1829, off from town of Richmond. Took its name from Canadice lake, which lies wholly within its boundaries

Canadice Corners. Business center of town of Canadice

Canadice lake. Name derived from the Indian name, Skan-e-a-tice, meaning "long lake"

Canandaigua. Name derived from that of Indian village on same site, (written also as Kanandarqua, Kennadarqua, Ganundagwa and otherwise), destroyed by Sullivan's army in 1779. Meaning "place set apart" or, more poetically expressed, "the chosen spot." First settled in 1789. County seat. Incorporated as village in 1815, as city 1919

Canandaigua lake. Named after Indian settlement near its foot

Centerfield. Hamlet on old Utica-Buffalo post road. So named because located half-way between Canandaigua and East Bloomfield

Chapin. Hamlet on outlet of Canandaigua lake, east of Canandaigua city in town of Hopewell. First named Chapinville after Captain Israel Chapin, builder of the first grist mill on the stream in 1789

Cheshire. Hamlet in Canandaigua town, named after Cheshire, Conn., from which several early settlers emigrated

Clifton Springs. Village in town of Manchester, first known as Sulphur Springs. Settled in 1800. Incorporated in 1859

Cold Springs. Former name of Bristol Springs, hamlet in town of South Bristol

Cook's point. Prominent point on west shore of Canandaigua lake. First settled by Frederick Winthrop Holcomb in 1812. Later named Cook's after Robert Cook, who conducted a popular summer boarding house on the point

Cottage City. Summer cottage colony on east shore of Canandaigua lake in town of Gorham

Covel Settlement. Small hamlet in town of South Bristol, named after a leading early settler, James Covel, who came from Woodstock, Vt., in 1806

D

Dennison's Corners. Small hamlet in town of Richmond, named from the pioneer Asa Dennison, who settled there in 1795

E

East hill. Sometimes called Kimball hill. Ridge between Canadice and Honeoye lakes

East hill. Eminence in town of Naples, east of Naples village. Sometimes called Hatch hill

East Bloomfield. Township set off in 1833 from town of Bloomfield, so named on account of its natural beauty

East Bloomfield. Village incorporated in 1916

Egypt. Valley east of Honeoye lake, known also as Burby Hollow

F

Farmington. Township named after Farmington, Conn. Settled by Quakers from Massachusetts in 1789

Fishers. Hamlet located in northwest part of town of Victor, named after pioneer family of same name

Flint Creek. Hamlet in town of Seneca, north of Stanley, named after a small stream known as Flint creek on account of its flinty bed

Frost Town. Locality in town of South Bristol, named after Jonathan and Jacob Frost, owners of an early saw mill on Mill creek

G

Ganargua. Stream, known also as Mud creek, which has its source in the South Bristol hills and runs northwardly through towns of Bristol and East Bloomfield, Victor and Farmington, an affluent of the Seneca river

Gan-na-go-ra. Indian village on Boughton hill, in present town of Victor, destroyed by Denonville in 1687

Gannett hill. Eminence in town of South Bristol, named after a pioneer settler, Horace Gannett

Gan-no-ga-rae. Indian village, 4 miles south of Gan-na-go-ra, also destroyed by Denonville in 1687

Geneva. City located on or near site of Indian village of Kanadesaga. Origin of name obscure, but probably because of its similar situation to the city of same name in Switzerland. So far as known it was first called Geneva by Dr Caleb Benton in dating a letter of October 14, 1788. Incorporated as a village in 1806, as a city in 1898

Geneva. Town created by Supervisors in 1872, through division of the town of Seneca. Separated from the city in 1898

Genundewah. Alternative Seneca name for Bare hill or Nundawo

Gorham. Township organized in 1789 as Easton. Name changed in 1806 to Lincoln. Again changed in 1807 to Gorham, in honor of Nathaniel Gorham

Gorham Village. Hamlet in town of Gorham, first known as Bethel, site of the first church building (Methodist) in the town

Gypsum. Hamlet in town of Manchester, first known as the Dutch Settlement, later as Plainsville, then named Gypsum on account of the plaster beds in the vicinity

Gulick. Location of a former post office in town of South Bristol. Named after Elisha Gulick

H

Hall's Corners. Hamlet in southern part of Seneca town, named after a pioneer settler, Edward Hall

Hatch hill. Eminence east of Naples Village. Called also East hill. Named for Francis Hatch, first settler to buy a farm on its summit

Hemlock lake *or* **O-neh-da.** Named from hemlock trees about its shores

Hilltown. Locality in District 10, town of South Bristol, where Erastus Hill, about the year 1818, settled and built a saw mill. Later location of post office called Gulick

Honeoye. Hamlet named from Honeoye lake, at whose foot it is located

Honeoye Falls. Hamlet in town of West Bloomfield, located on Honeoye lake outlet

Honeoye lake. Indian name, Ha-nyah-yeh, meaning "finger lying"

Holcomb. Hamlet in town of East Bloomfield. Named after Hiram Holcomb, a prominent business man. Incorporated in 1916

Hopewell. Township, set off from town of Gorham in 1822. Named to express sentiments of those who secured its formation as a separate civil division

Hopewell Center. Hamlet in town of Hopewell

I

Ionia. Hamlet in town of West Bloomfield. Classical name. Former name of Miller's Corners dropped in 1898, to avoid confusion resulting from post offices of similar names in other parts of the State

K

Kanadesaga. Chief "castle" of the Seneca Indians, located on land now occupied by State Experiment Station in west part of city of Geneva. Destroyed by Sullivan in 1779. Indian name meaning "new settlement village"

L

Littleville. Hamlet on Canandaigua lake outlet, short distance south of Chapin, named after an early miller and merchant, Norman C. Little

M

Manchester. Township set off from Farmington in 1821 and first called Burt, changed to Manchester in 1822

Manchester Center. Hamlet in town of Manchester. First named Coonsville after a pioneer by the name of Coon

Manchester Village. Named after Manchester, N. H., and Manchester, England, in view of its prospective manufacturing importance on account of being on Canandaigua lake outlet. Incorporated in 1892

Mertensia. Hamlet in town of Farmington. Named from the mertensia or bluebell, a wild flower that blooms profusely in the neighborhood

Mill creek. In town of South Bristol, where an early mill was located

Miller's Corners. Hamlet in town of West Bloomfield, named after a pioneer settler, Samuel Miller. Name changed to Ionia, to avoid confusion with post offices of Mill's Corners and Millers

Mormon hill. Eminence in town of Manchester, 2½ miles north of Manchester Village, from which Joseph Smith, founder of Mormonism, claimed to have taken the golden plates from which he transcribed the Book of Mormon.

Mud creek. Named by the Indians Ganargua. Has its origin in the South Bristol hills, runs northerly through the towns of Bristol, East Bloomfield and Farmington to its confluence with the Seneca river, a tributary of the Oswego river

Muttonville. Hamlet in town of Bristol. So named in early days on account of its being a center for slaughtering sheep. Now known as Vincent

N

Naples. Township, named from the Italian city

Naples. Village in town of same name. First known as Watkinstown, later as Middletown, and finally as Naples. Incorporated in 1894

New Salem. Known also as " Pumpkin Hook " in town of Farmington. Named by early settlers after Salem, Mass.

O

Oaks Corners. Named after Jonathan Oaks, an early innkeeper. Located 3 miles southeast of the village of Phelps

Onnaghee. Name of Indian village, in what is now the township of Hopewell

Ontario county. Named after Lake Ontario, which at the organization of the county in 1789 formed its northern boundary. Combination of two Indian words, "Oniatara," meaning "lake," and "io," meaning "beautiful," "noble" or "good"

Orleans. Hamlet in town of Phelps. Originally known as "Hardscrabble"

P

Phelps. Township, first named Sullivan in honor of General Sullivan, changed to Phelps in 1796 in honor of Oliver Phelps

Phelps Junction. Junction, in town of Phelps, of Auburn branch of New York Central railroad and Sodus branch of Pennsylvania railroad

Phelps Village. First named Vienna. Incorporated as Phelps in 1855

Port Gibson. Port on the Erie canal in town of Manchester. Named after Henry B. Gibson, prominent early banker of Canandaigua

Powell hill. Hill in town of South Bristol where Shotwell Powell, who came from Dutchess county in 1844, established his home

Pumpkin Hook *or* **New Salem.** First settlement in town of Farmington. An early resident suffered loss of his crop of pumpkins by theft, hence the nicknames, "Pumpkin Hookers" and "Pumpkin Hook"

R

Reed Corners. Hamlet in town of Gorham. Named after Silas Reed, a pioneer

Richmond. First named (1801) Pittstown, in honor of Captain Peter Pitts. Changed (1808) to Honeoye, again changed (1815) to Richmond, in honor of Abigail Richmond, wife of Captain Pitts

Richmond Mills. Hamlet in western part of town of Richmond, on outlet of Hemlock lake

Rushville. Village, located on line between town of Gorham, Ontario county, and town of Potter, Yates county. Settlement was first known as Federal Hollow, probably because most of the inhabitants were New England Federalists. Named Rushville in 1818

at suggestion of Dr Ira Bryant, in honor of Dr Benjamin Rush of Philadelphia, an eminent early physician, member of the Continental Congress and signer of the Declaration of Independence. Incorporated in 1866

S

Seneca. Township, organized 1793. Divided in 1872 by erection of town of Geneva. Named after Seneca nation of Indians, sometimes called the Cinques, the Seneks, etc.

Seneca Castle. Hamlet in northwest part of Seneca town. So named because of its proximity to a "castle" or village of the Seneca Indians

Seneca point. Prominent feature of west shore of Canandaigua lake, located in town of South Bristol, first known as Wilder's point from the fact that it was selected as site of first home built, in 1789, by the pioneer, Gamaliel Wilder, who found there an Indian orchard, the only one in the vicinity not destroyed by Sullivan's army

Shortsville. Village, in town of Manchester, on New York Central railroad, named after Theophilus Short, in 1804. First to utilize water power of Canandaigua lake outlet at that point. First known as Shorts Mills. Incorporated in 1889

South Bristol. Formerly a part of the town of Bristol. Set apart as a separate township, March 8, 1838. Hamlet of same name near center of town

Stanley. Hamlet near center of town of Seneca. Named for Seth Stanley, a prominent early settler

Stid hill. Eminence in town of South Bristol, named after an early settler, Benjamin Stid

Sucker brook. Inlet at foot of Canandaigua lake. So named because formerly frequented by the fish known as suckers

T

Trap brook. Known also as Beaver creek; stream in town of Farmington

Tuttle's. Station on Lehigh Valley railroad in town of Farmington. Named after prominent family of the neighborhood

U

Unionville. Hamlet in town of Phelps

V

Victor. Township set off from Bloomfield in 1812 and named after Claudius Victor Boughton, son of a prominent citizen, Hezekiah Boughton jr

Victor. Village, incorporated December 8, 1879

Vincent. Hamlet in Bristol township, first known as Muttonville. Now named Vincent after Dr Thomas Vincent, who settled there in 1797

W

West Bloomfield. Township set off from Bloomfield in 1833. Village of same name not incorporated. Site of Indian castle "Ga-nun-da-ok," meaning "village on top of hill"

West Junius. Hamlet in town of Phelps on line between Ontario and Seneca counties

West river. Inlet of Canandaigua lake, enters at the head or south end of the lake

Whaleback. Long wooded hill on the east side of Canandaigua lake at its head

Woodville. Landing at head of Canandaigua lake, from which formerly large quantities of wood were shipped.

Worden hill. Eminence in town of South Bristol. Was early settled by three brothers named Worden

A VERNON SHALE (SILURIAN) FAUNA IN CENTRAL NEW YORK

BY H. N. EATON

While pursuing field studies on the Baldwinsville, N. Y., quadrangle, directly west of Syracuse, in 1922 the writer found a fauna in the Vernon red shale. The discovery is important as no fossils have been found in the Vernon shale in central New York and also because of the strange association of the fossils with casts of crystals of rock salt in a formation evidently produced under arid conditions.

Occurrence and stratigraphy. The fossils were found in an outcrop along a state highway in Elbridge township, 14½ miles west-northwest of Syracuse, and 2 miles east of the village of Jordan. The road runs along the base of a low escarpment of shale hills on the southern side of the east-west channel occupied by the Erie canal and two main railroad lines.

The fossiliferous horizon occurs in the Vernon red shale, 13 feet stratigraphically below the contact with the Camillus shale formation. The bed consists of two parts: an upper layer of buff colored clay giving a strong reaction for lime, 4½ inches thick; and a lower drab colored layer, 9 inches thick.

Characteristic of the upper layer are several small cavities varying in size to a maximum of more than 1 inch in diameter, lined with crystals of aragonite. A few molds of salt hoppers occur sparingly in this upper layer closely associated with fossils. The term "hopper" has been applied to a cast in the shale assumed to be pseudomorphic after original halite. They are common in the Camillus shale in the Syracuse region and have been reported by Hopkins[1]. In the lower layer near the contact with the underlying red shale several hoppers were found. Small flakes of specular hematite occur rarely in the Vernon formation, and in one instance on the face of one of these hoppers.

Fauna. The fossils including old and new forms are listed below. They have been deposited in the New York State Museum at Albany.

Leperditia scalaris (Jones)
Calymene? niagarensis Hall
Phragmoceras sp.

[1] Hopkins, T. C. The Geology of the Syracuse Quadrangle, N. Y. State Mus. Bul. 171, 1914, p. 32–33.

Diaphorostoma? niagarense (Hall)?
Poleumita scamnata Clarke and Ruedemann
Streptomytilus? cf. eduliformis (Clarke and Ruedemann)
Cuneamya cf. alveata Whitfield and Hovey
Ctenodonta cf. salinensis Ruedemann
C. ruedemanni nov.
Pterinea cf. poststriata Ruedemann
P. rotunda nov.
P. jordani nov.
P? sp.
Orthodesma? sp.
Camarotoechia litchfieldensis (Schuchert)
Lingula vernoni nov.
Cornulites hopkinsi nov.

Besides the above several unidentified ostracods, and forms resembling bryozoa occur.

The fossils are sparingly distributed in the rock at best, and their fragmentary nature renders specific determination difficult in many cases. In general the fauna consists largely of pelecypods. Only two brachiopods were found, of which Camarotoechia litchfieldensis is quite abundant. No Salina eurypterids were observed. The fauna appears to be typically mid-Sherman with a mixture of Niagaran and Salinan forms. A majority of the old species occur through the Cayugan, two slightly later. Two were reported previously in the Niagaran (Guelph) only, and one in the lower Clinton. The fauna is marine, and flourished apparently in a solution concentrated enough to allow of the occasional crystallization of halite. This interesting fact may aid in the determination of the origin of the Vernon formation.

Descriptions of Species

Ctenodonta ruedemanni nov.

Plate 1, figure 4

Shell small, strongly inequilateral, with a length of about 1½ times the height, flat. Beak prominent and mildly acute, set far forward with a resulting distinct apical angle. Dorsal line convex and sloping as in C. salinensis. Anterior margin rounded, posterior probably sharper. Surface covered with indistinct lines of growth. A single left valve only was found.

This species resembles the Salina species C. salinensis, but its beak is slightly farther forward than that of the latter.

Length about 11 mm; height 7.5 mm.

Named after Dr Rudolf Ruedemann of the New York State Museum who recognized it as a new species.

Pterinea rotunda nov.

Plate 1, figure 6

Shell small, length slightly greater than the height although the exact proportions are difficult to determine owing to the fragmentary nature of the material, the left valve only being known. General form rounded, posterior wing prominent, anterior wing missing on specimen. Hinge-line straight, about two-thirds length of shell. The beak is prominent and is the attenuate expression of the natural body rotundity. Radial markings faint, scarcely visible without the aid of a lens. Concentric growth lines.

Length estimated about 21 mm; height 18 mm.

Pterinea jordani nov.

Plate 1, figure 8

Shell moderately large with length and height about equal, hinge-line straight about three-fourths total length, form rounded as in P. rotunda nov. described above. Posterior wing broad probably extending as far as the posterior margin of the shell. Anterior wing well defined but not sharply set off from the front margin, making a wide obtuse angle with the upper margin. Concentric growth-lines covering the entire shell, best shown on wings.

This species is the largest of the fauna and is known from poorly preserved left valves only.

Approximate measurements are as follows: length 27 mm; height 28 mm.

Named from the village of Jordan 2 miles west of the outcrop.

Pterinea? sp.

Plate 1, figure 7

A pelecypod showing generic affinities with Pterinea was found. It exhibits plain concentric growth-lines and faint radial markings on the left valve, and the right valve shows evidences of ribs. Posterior wing plain, anterior poorly shown.

Length 29 mm; height about 29 mm.

Orthodesma? sp.

Plate 1, figure 5

Fragments of a shell were found not admitting of determination but having the general characteristics of Orthodesma or Rhytimya. Shell long compared with its height. Anterior portion of the shell set off by a shallow but distinct sulcus. Hinge-line not preserved. Left valve convex, ending posteriorly in a prominent umbonal ridge. Distinct concentric folds, which are stronger in front. Left valve only preserved.

One of the smaller specimens has the following dimensions: length 26 mm; height about 18 mm.

Lingula vernoni nov.

Plate 1, figures 1 and 2

Shell small, sides nearly straight and parallel, beak subacute, anterior margin subquadrate. Much resembles L. clintoni but differs in the total absence of radiating striae. Many fine concentric growth-lines. Faint traces of a median septum visible.

One pedicle valve only found with portions of the original shell. Length 10.5 mm; width 5.5 mm.

Cornulites hopkinsi nov.

Plate 1, figure 3

Cornulites arcuatus Conrad in the Guelph fauna is briefly described thus: "Curved, rapidly attenuate; the base of each ring contracted, the upper edge angular." (Clarke and Ruedemann, 1903.)

The new species closely resembles C. arcuatus, differing mainly in its more abrupt taper and possible greater angularity of upper edge of ring. Doctor Ruedemann thinks that a new specific name is justified.

Length 18 mm; greatest observed width about 7 mm.

Named after Dr Thomas Cramer Hopkins of Syracuse University.

Acknowledgments. The writer wishes to thank Dr Rudolf Ruedemann for help in the identifications. Dr Burnett Smith of Syracuse University has made valuable suggestions. N. E. Weisbord of Cornell University and Edwin J. Stein of Albany made the photographs.

EXPLANATION OF PLATE

[115]

Lingula vernoni nov.

Fig. 1 Mold of type. x 3

Fig. 2 Type. Pedicle valve. x 3

Cornulites hopkinsi nov.

Fig. 3 Holotype. x 2

Ctenodonta ruedemanni nov.

Fig. 4 Holotype. x 2

Orthodesma sp.

Fig. 5 Left valve. x 1½

Pterinea rotunda nov.

Fig. 6 Holotype. x 2

Pterinea sp.

Fig. 7 Right valve. x 1½

Pterinea jordani nov.

Fig. 8 Holotype. x 1½

The originals of the figures are in the New York State Museum.

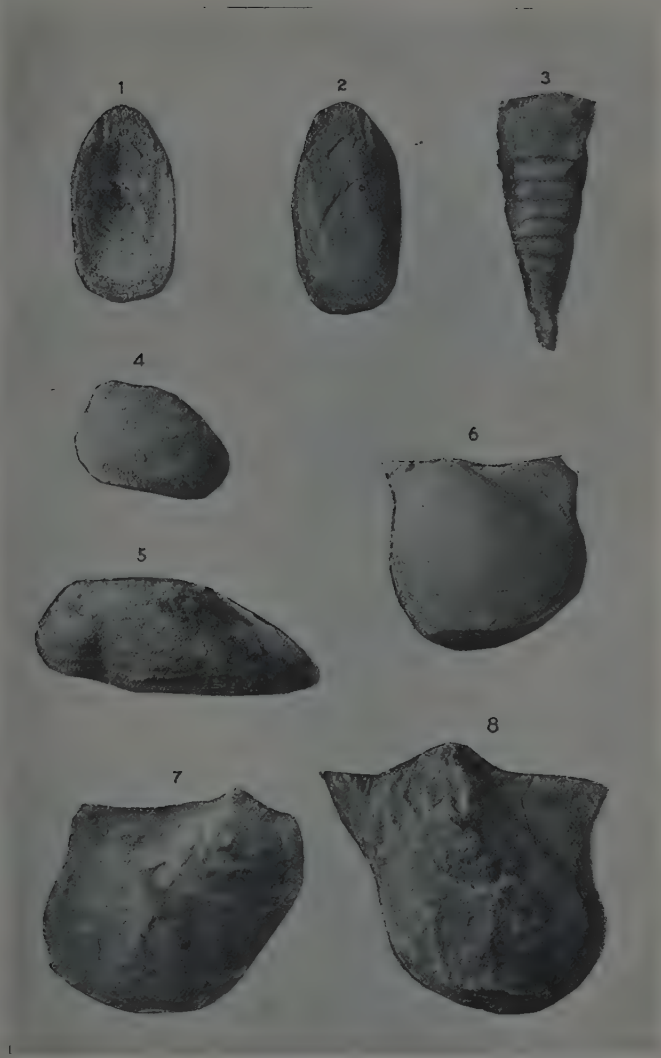
NOTE. From Dr E. O. Ulrich, to whom some of the ostracods had been sent for identification; the following important note was received after this paper had gone through the press:

The ostracods are sufficiently well preserved to warrant the following specific and generic identifications:

Kloedenia normalis U. and B.
Dizygopleura acuminata U. and B.

Both of these species are particularly characteristic of the lower part of the Wills creek and the upper part of the McKenzie formation in Maryland, hence of the position to which I have assigned the Vernon shale. (See Maryland Rep't, 1923, p. 267.)

Vernon Shale Fauna



D. DANA LUTHER, MILLER AND GEOLOGIST

1840 — 1923

D. Dana Luther, beloved of all who knew him, died at his home in Naples, N. Y., December 17, 1923. He joined the geological staff of this institution in 1891 and served continuously until his retirement in 1916. He was 51 years old when this service began and 76 when it ceased.

There was much in Mr Luther's life that was picturesque and unusual. Many of its features bring it into comparison with the lives of Hugh Miller, the Scotch stonemason, and of Robert Dick, the baker of Thurso; one a great geologist and expositor, the other, geologist and botanist of more than local merit, whose story has served as a lesson to boys of the right sort. A thoughtful and reflective stonemason might well become a geologist, and a lover of all Nature might prefer his communion with her to the compulsions of the bread board. With Mr Luther, a miller, it was a mantle of sorrow that fell upon him in middle life which seemed to turn his overwhelmed thoughts from his business to the untrammeled spaces among the hills of his native valley. From the catastrophe of a broken home circle, a motherless group of little children and a growing disability from miller's asthma, he sought and found an inspiring release where Nature had provided it. It was in this episode of sorrow that he learned to hear the voices in the rocks, the woods and the fields.

Calvin Luther and Rebecca Dana were strong names and strong characters. They were of the Puritan stock from Berkshire county which spread westward toward the Genesee country, the frontier, after Sullivan's raiders upon the Seneca settlements had brought back wondrous stories of the fertility of the land. These parents were not of the first venturers into this remote and hill-crowned valley of Naples; they were nevertheless early arrivals, and Mr Luther passed his entire home life in the generous house which his father built on the high terraced bank of the valley creek. Close to it was his father's mill where for a generation the countryside ground its grist and found its flour and meal, and here Dana Luther ground out the modest living of his early manhood.

Mr Luther was the writer's friend. Like interests in the mysteries of the rocks brought them together at just the critical time when Nature was ministering to his wound; the staid, wise and cautious

man and the young, trained enthusiast. With that acquaintance came long summers together of excursions into all the rocks of western New York, with a perfect abandon of delight that made him oblivious to the carking things of business. Because of his miller's asthma Mr Luther was obliged to give over his hereditary occupation and as a means of support he opened a small haberdashery in the village, but no summer day with its temptations afield was missed because of mere business. Often and again the key to the store was turned, and the devoted two, one of whom had nothing else to do and both of them everything to learn, were off and away. To Mr Luther it was all a new world; every fact observed, every fossil found had to be interpreted for him and his zeal for these interpretations led him to close and careful reading and study of the science during the long intervals between summer and summer. Mr Luther had only a common school education supplemented by a year or two of study at the old academy at Canandaigua, but his mind had the poise and balance of a magistrate's and the receptiveness of an acolyte's. Besides and above this, he had a training in wisdom from an extraordinary mother who herself took counsel of all the works of God. Thirteen summers of these adventures into the rocks and thirteen winters at study of the science, years that were productive of discoveries of no little moment to geology, gave Mr Luther a perfectly competent equipment to handle the more obvious problems of the rocks in the well-built country of western New York.

In 1891 a start was made on a great shaft at Livonia, Livingston county, which was to go down to the salt, a proposed excavation covering a prism 18 feet square and as long as the depth of the salt below the surface which proved to be at 1400 feet. It was to be a great plug cut out of the heart of the most richly fossiliferous rocks in the State and into the unsolved succession of the salt-bearing beds. It afforded a rare opportunity for the extensive acquisition of detailed information of the order and variations of the succession of rocks and faunas, one never before or since afforded. To this work, continuous through summer and winter, Mr Luther was assigned on behalf of this Department and thus he entered formally on his official service for the State. The work led naturally into a wider study of the geology of the salt formations throughout the region of their best development, and in this larger field Mr Luther brought together data whose usefulness has become evident. During these years we were largely without adequate topographic maps for the plotting of areal geology, but as these became available for the

D. Dana Luther
1840–1923

western New York region they were put in service for this areal survey work, and one after another of these quadrangles, each covering an area of about 200 square miles, was surveyed and plotted by Mr Luther. In a few of these the writer joined, but for the most part Mr Luther did the work single handed. The field was not one of complicated structure but the distinctions between the rock formations required caution and mature judgment, especially in the case of the great formations of the Upper Devonian which slowly graduate westward to Lake Erie into quite distinct faunistic phases. The survey work thus done was reliable, and Mr Luther covered a larger area of this record on the scale-maps of 1 inch to the mile than has been done by any other geological surveyor connected with this organization. Equally important to the science were the discoveries of new fossils that were turned up in connection with this work. Mr Luther was a careful and excellent collector and our present knowledge of the extensive and extraordinary Upper Devonian faunas of New York which have been described in the paleontological reports of this survey, is in sharp contrast to the poverty of what we knew when he began his work. Dana Luther's labors were an impressive illustration of the fact that a natural common sense, good judgment and painstaking patience, governed by a genuine and intense love of his work, are a better equipment than the average technical training in a younger man who lacks those virtues.

Naples and the surrounding country had been regarded by the older geologists as singularly forbidding and unproductive territory in the remains of extinct life, but that old desert has now been made to blossom like the rose since the days when Luther began his work, and its bare rocks have produced a fauna of unequalled interest. Among his notable discoveries was the finding of the great tree trunk in the Portage or lower division of the Upper Devonian in the rocks of Naples—the Protolepidodendron. This was one of the earliest of all the trees of the world, a lepidodendrid, which now stands, both the original and the restoration, in the State Museum. It had floated out from the land into the marine waters of that ancient time and was located by its finder by a mere thin line of coaly substance on the edge of a rock ledge in one of the Naples ravines. A part of the overlying rock was lifted and the nature of the fossil disclosed. Then the concealed trunk, constantly enlarging in diameter, was followed back straight into the cliff under a pigsty and into a pasture with an increasing overload until the bulging root

was found, altogether a trunk 18 feet long and entirely unique. While this discovery had an element of the spectacular and won for the "Naples Tree" a wide publicity, a multitude of other discoveries of equal significance stand to his credit, and many species of ancient creatures have been baptized in his name.

Mr Luther was a good citizen. He was the first president of his village, was secretary of its board of education for many years and was for a long time a justice of the peace. He carried his living interests into his retirement, rounded out a full and generous life of wise service and his children and his grandchildren in the flesh and in the spirit, rise up and call him blessed.

John M. Clarke

New York State Museum

JOHN M. CLARKE, Director

PUBLICATIONS

Packages will be sent prepaid except when distance or weight renders the same impracticable. On 10 or more copies of any one bulletin 20% discount will be given. Editions printed are only large enough to meet special claims and probable sales. When the sale copies are exhausted the price for the few reserve copies is advanced to that charged by secondhand booksellers, in order to limit their distribution to cases of special need. Such prices are inclosed in [ ]. All publications are in paper covers, unless binding is specified. Checks & money orders should be addressed and payable to The University of the State of New York.

Museum annual reports 1847–1917. Of the report for 1918 only volumes 2 and 3 were published. *All in print to* 1894, 50c *a volume,* 75c *in cloth;* 1894–*date, sold in sets only;* 75c *each for octavo volumes; price of quarto volumes on application.*

These reports are made up of the reports of the Director, Geologist, Paleontologist Botanist and Entomologist, and museum bulletins and memoirs, issued as advance sections of the reports.

Director's annual reports 1904–date.

1904. 138p. 20c.
1905. 102p. 23pl. 30c.
1906. 186p. 41pl. 25c.
1907. (Bul. 121) 212p. 63pl. 50c.
1908. (Bul. 133) 234p. 39pl. map. 40c.
1909. (Bul. 140) 230p. 41pl. 2 maps, 4 charts. *Out of print*
1910. (Bul. 149) 280p. il. 42pl. 50c.
1911. (Bul. 158) 218p. 49pl. 50c.
1912. (Bul. 164) 214p. 50pl. 50c.
1913. (Bul. 173) 158p. il. 29pl. 40c.
1914. (Bul. 177) 174p. il. 33pl. 45c.
1915. (Bul. 187) 192p. il. 58pl. 5 maps. *Out of print.*
1916. (Bul. 196) 308p. il. 50pl. maps. 55c
1917. (Bul. 207, 208) 211p. il. maps. 75c.
1918. (Bul. 219, 220) 309p. il. 43 pl. 75c.
1919. (Bul. 227, 228) 146p. il. maps. 50c.
1920–21. (Bul. 239–240) 209p. il. maps. *Out of print.*
1922. (Bul. 251) 221p. il. 50 pl. map. *Out of print.*
1923. (Bul. 253) p. il., pl.

These reports cover the reports of the State Geologist and of the State Paleontologist. Bound also with the museum reports of which they form a part.

Geologist's annual reports 1881–date. Rep'ts 1, 3–13, 17–date, 8vo; 2, 14–16, 4to.

In 1898 the paleontologic work of the State was made distinct from the geologic and was reported separately from 1899–1903. The two departments were reunited in 1904, and are now reported in the Director's report.

The annual reports of the original Natural History Survey, 1837–41, are out of print.

Reports 1–4, 1881–84, were published only in separate form. Of the 5th report 4 pages were reprinted in the 39th museum report, and a supplement to the 6th report was included in the 40th museum report. The 7th and subsequent reports are included in the 41st and following museum reports, except that certain lithographic plates in the 11th report (1891) and 13th (1893) are omitted from the 45th and 47th museum reports.

Separate volumes of the following only are available.

Report	*Price*	*Report*	*Price*	*Report*	*Price*
12 (1892)	*Out of print*	17	$1.00	21	$.40
14	1.00	18	.75	22	.40
15, 2v.	2.50	19	[.50]	23	.45
16	1.50	20	.50	[*See* Director's annual reports]	

Paleontologist's annual reports 1899–date.

See first note under Geologist's annual reports.

Bound also with museum reports of which they form a part. Reports for 1899 and 1900 may be had for 20c each. Those for 1901–3 were issued as bulletins. In 1904 combined with the Director's report.

Entomologist's annual reports on the injurious and other insects of the State of New York 1882–date.

Reports 3–20 bound also with museum reports 40–46, 48–58 of which they form a part. Since 1898 these reports have been issued as bulletins. Reports 3–4, 17 are out of print, other reports with prices are:

Report	*Price*	*Report*	*Price*	*Report*	*Price*
1	*Out of print*	13	*Out of print*	24 (Bul. 134)	$.35
2	.30	14 (Bul. 23)	$.20	25 (" 141)	.35
5	.25	15 (" 31)	.15	26 (" 147)	.35
6	.15	16 (" 36)	.25	27 (" 155)	.40
7	.20	18 (" 64)	.20	28 (" 165)	.40
8	.25	19 (" 76)	.15	29 (" 175)	.40
9	.25	20 (" 97)	.40	30 (" 180)	.50
10	.35	21 (" 104)	.25	31 (" 186)	.35
11	.25	22 (" 110)	.25	32 (" 198)	.40
12	.25	23 (" 124)	.75	33 (" 202)	.35

Reports 2, 8–12 may also be obtained bound in cloth at 25c each in addition to the price given above.

Botanist's annual reports 1867–date.

Bound also with museum reports 21–71 of which they form a part; the first Botanist's report appeared in the 21st museum report and is numbered 21. Reports 21–24, 29, 31–41 were not published separately.

Separate reports for 1871–74, 1876, 1888–99 are out of print. Report for 1900 may be had for 50c. Since 1901 these reports have been issued as bulletins.

Descriptions and illustrations of edible, poisonous and unwholesome fungi of New York have also been published in volumes 1 and 3 of the 48th (1894) museum report and in volume 1 of the 49th (1895), 51st (1897), 52d (1898), 54th (1900), 55th (1901), in volume 4 of the 56th (1902), in volume 2 of the 57th (1903), in volume 4 of the 58th (1904), in volume 2 of the 59th (1905), in volume 1 of the 60th (1906), in volume 2 of the 61st (1907), 62d (1908), 63d (1909), 64th (1910), 65th (1911), v. 2 of the 66th (1912) reports. The descriptions and illustrations of edible and unwholesome species contained in the 49th, 51st and 52d reports have been revised and rearranged, and, combined with others more recently prepared, constitute Museum Memoir 4.

Museum bulletins 1887–date. 8vo. (1) *geology, economic geology, paleontology, mineralogy;* (2) *general zoology, archaeology, miscellaneous;* (3) *botany* (4) *entomology.*

Bulletins are grouped in the list on the following pages according to divisions. The divisions to which bulletins belong are as follows:

1 Zoology
2 Botany
3 Economic Geology
4 Mineralogy
5 Entomology
6 "
7 Economic Geology
8 Botany
9 Zoology
10 Economic Geology
11 " "
12 " "
13 Entomology
14 Geology
15 Economic Geology
16 Archeology
17 Economic Geology
18 Archeology
19 Geology
20 Entomology
21 Geology
22 Archeology
23 Entomology
24 "
25 Botany
26 Entomology
27 "
28 Botany
29 Zoology
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31 Entomology
32 Archeology
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34 Geology
35 Economic Geology
36 Entomology
37 "
38 Zoology
39 Paleontology
40 Zoology
41 Archeology
42 Geology
43 Zoology
44 Economic Geology
45 Geology and Paleontology
46 Entomology
47 "
48 Geology
49 Paleontology
50 Archeology
51 Zoology
52 Paleontology
53 Entomology
54 Botany
55 Archeology
56 Geology
57 Entomology
58 Mineralogy
59 Entomology
60 Zoology
61 Economic Geology
62 Miscellaneous
63 Geology
64 Entomology
65 Paleontology
66 Miscellaneous
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251 Director's report for 1922
252 Zoology
253 Director's report for 1923

Bulletins are also found with the annual reports of the museum as follows:

Bulletin	*Report*	*Bulletin*	*Report*	*Bulletin*	*Report*	*Bulletin*	*Report*
12–15	48, v. 1	85	58, v. 2	131, 132	62, v. 2	192	70, v. 1
16, 17	50, v. 1	86	58, v. 5	133	62, v. 1	193	70, v. 1
18, 19	51, v. 1	87–89	58, v. 4	134	62, v. 2	194	70, v. 2
20–25	52, v. 1	90	58, v. 3	135	63, v. 1	195	70, v. 1
26–31	53, v. 1	91	58, v. 4	136	63, v. 2	196	70, v. 1
32–34	54, v. 1	92	58, v. 3	137, 138	63, v. 1	197	70, v. 2
35, 36	54, v. 2	93	58, v. 2	139	63, v. 2	198	70, v. 2
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45–48	54, v. 4	95, 96	58, v. 1	141–43	63, v. 2	200	71, v. 2
49–54	55	97	58, v. 5	144	64, v. 2	201	71, v. 1
55	56, v. 4	98, 99	59, v. 2	145, 146	64, v. 1	202	71, v. 2
56	56, v. 1	100	59, v. 1	147, 148	64, v. 2	203–4	71, v. 1
57	56, v. 3	101	59, v. 2	149	64, v. 1	205–6	71, v. 2
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59, 60	56, v. 3	103–5	59, v. 2	155–57	65, v. 2		
61	56, v. 1	106	59, v. 1	158–60	65, v. 1	*Memoir*	
62	56, v. 4	107	60, v. 2	161	65, v. 2	2	49, v. 3, and 50, v. 2
63	56, v. 2	108	60, v. 3	162	65, v. 1	3, 4	53, v. 2
64	56, v. 3	109, 110	60, v. 1	163	66, v. 2	5, 6	57, v. 3
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66, 67	56, v. 4	112	60, v. 1	165–67	66, v. 2	8, pt 1	59, v. 3
68	56, v. 3	113	60, v. 3	168–70	66, v. 1	8, pt 2	59, v. 4
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70, 71	57, v. 1, pt 1	115	60, v. 2	177–80	68	9, pt 2	62, v. 4
72	57, v. 1, pt 2	116	60, v. 1	181	69, v. 2	10	60, v. 5
73	57, v. 2	117	60, v. 3	182, 183	69, v. 1	11	61, v. 3
74	57, v. 1, pt 2	118	60, v. 1	184	69, v. 2	12, pt 1	63, v. 3
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77	57, v. 1, pt 1	123	61, v. 1	187	69, v. 1	14, v. 1	65, v. 3
78	57, v. 2	124	61, v. 2	188	69, v. 2	14, v. 2	65, v. 4
79	57, v. 1, pt 2	125	62, v. 3	189	69, v. 1	15, v. 1	72, v. 2
80	57, v. 1, pt 1	126–28	62, v. 1	190	69, v. 2	15, v. 2	72, v. 3
81, 82	58, v. 3	129	62, v. 2	191	70, v. 1		
83, 84	58, v. 1	130	62, v. 3				

The figures at the beginning of each entry in the following list indicate its number as a museum bulletin.

Geology and Paleontology. 14 Kemp, J. F. Geology of Moriah and Westport Townships, Essex Co., N. Y., with notes on the iron mines. 38p. il. 7pl. 2 maps. Sept. 1895. *Free.*

19 Merrill, F. J. H. Guide to the Study of the Geological Collections of the New York State Museum. 164p. 119pl. map. Nov. 1898. *Out of print.*

21 Kemp, J. F. Geology of the Lake Placid Region. 24p. 1pl. map. Sept. 1898. *Out of print.*

34 Cumings, E. R. Lower Silurian System of Eastern Montgomery County; Prosser, C. S. Notes on the Stratigraphy of Mohawk Valley and Saratoga County, N. Y. 74p. 14pl. map. May 1900. 15c.

39 Clarke, J. M.; Simpson, G. B. & Loomis, F. B. Paleontologic Papers 1. 72p. il. 16pl. Oct. 1900. 15c.

Contents: Clarke, J. M. A Remarkable Occurrence of Orthoceras in the Oneonta Beds of the Chenango Valley, N. Y.
—— Paropsonema cryptophya; a Peculiar Echinoderm from the Intumescens-zone (Portage Beds) of Western New York.
—— Dictyonine Hexactinellid Sponges from the Upper Devonic of New York.
—— The Water Biscuit of Squaw Island, Canandaigua Lake, N. Y.
Simpson, G. B. Preliminary Descriptions of New Genera of Paleozoic Rugose Corals.
Loomis, F. B. Siluric Fungi from Western New York.

42 Ruedemann, Rudolf. Hudson River Beds near Albany and Their Taxonomic Equivalents. 116p. 2pl. map. Apr. 1901. 25c.

45 Grabau, A. W. Geology and Paleontology of Niagara Falls and Vicinity. 286p. il. 18pl. map. Apr. 1901. 65c; *cloth*, 90c.

48 Woodworth, J. B. Pleistocene Geology of Nassau County and Borough of Queens. 58p. il. 8pl. map. Dec. 1901. *Out of print.*

49 Ruedemann, Rudolf; Clarke, J. M. & Wood, Elvira. Paleontologic Papers 2. 240p. 13pl. Dec. 1901. *Out of print.*

Contents: Ruedemann, Rudolf. Trenton Conglomerate of Rysedorph Hill.
Clarke, J. M. Limestones of Central and Western New York Interbedded with Bituminous Shales of the Marcellus Stage.
Wood, Elvira. Marcellus Limestones of Lancaster, Erie Co., N. Y.
Clarke, J. M. New Agelacrinites.
—— Value of Amnigenia as an Indicator of Fresh-water Deposits during the Devonic of New York, Ireland and the Rhineland.

52 Clarke, J. M. Report of the State Paleontologist 1901. 280p. il. 10pl. map, 1 tab. July 1902. 40c.

56 Merrill, F. J. H. Description of the State Geologic Map of 1901. 42p. 2 maps, tab. Nov. 1902. *Out of print.*

63 Clarke, J. M. & Luther, D. D. Stratigraphy of Canandaigua and Naples Quadrangles. 78p. map. June 1904. 25c.

65 Clarke, J. M. Catalogue of Type Specimens of Paleozoic Fossils in the New York State Museum. 848p. May 1903. $1.20, *cloth.*

69 —— Report of the State Paleontologist 1902. 464p. 52pl. 7 maps. Nov. 1903. $1, *cloth.*

77 Cushing, H. P. Geology of the Vicinity of Little Falls, Herkimer Co. 98p. il. 15pl. 2 maps. Jan. 1905. 30c.

80 Clarke, J. M. Report of the State Paleontologist 1903. 396p. 29pl. 2 maps. Feb. 1905. 85c, *cloth.*

81 Clarke, J. M. & Luther, D. D. Watkins and Elmira Quadrangles. 32p. map. Mar. 1905. 25c.

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Catalogue of the Cabinet of Natural History of the State of New York and of the Historical and Antiquarian Collection annexed thereto. 242p. 8vo. 1853. *Out of print.*

Handbooks 1893–date.

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Paleontology. 12p. 1899. *Out of print.*

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Guide to the Collections of General Geology and Ecomnoic Geology, prepared by Robert W. Jones, p. 31. 1917. *Free.*

Guide to the Paleontological Collections, prepared by Rudolf Ruedemann. p. 35. il. 1916. *Out of print.*

Geologic maps. Merrill, F. J. H. Economic and Geologic Map of the State of New York; issued as part of Museum Bulletin 15 and 48th Museum Report, v. 1. 59 x 67 cm. 1894. Scale 14 miles to 1 inch. 15c.

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*Alexandria Bay quadrangle. 1910. *Free.*
*Cape Vincent quadrangle. 1910. *Free.*
*Clayton quadrangle. 1910. *Free.*
*Grindstone quadrangle. 1910. *Free.*
*Theresa quadrangle. 1910. *Out of print.*
*Poughkeepsie quadrangle. 1911. *Out of print.*
*Honeoye-Wayland quadrangles. 1911. 20c.
*Broadalbin quadrangle. 1911. *Free.*
*Schenectady quadrangle. 1911. *Out of print*
*Saratoga-Schuylerville quadrangles. 1914. *Out of print.*
*North Creek quadrangle. 1914. *Free.*
*Syracuse quadrangle. 1914. *Free.*
*Attica-Depew quadrangles. 1914. 20c.
*Lake Pleasant quadrangle. 1916. *Free.*
*Saratoga quadrangle. 1916. *Free.*
*Canton quadrangle. 1916. *Free.*
*Brier Hill, Ogdensburg and Red Mills quadrangles. 1916. 15c.
*Blue Mountain quadrangle. 1916. *Out of print.*
*Glens Falls, Saratoga, Schuylerville, Schenectady and Cohoes quadrangles. 1917. 20c.
Lake Placid quadrangle. 1919. *Out of print.*
Schrron Lake quadrangle. 1919. *Out of print.*
Cohoes quadrangle. 1920. *Out of print.*
Canton quadrangle. 1920. *Out of print.*
*West Point quadrangle. 1921. *Free.*
*Mount Marcy quadrangle. 1921. *Free.*

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NOTES

Surveyed with pocket compass
---------- Paths or trails
========== Wagon Roads
The numbers are height above lake in feet.
Contour lines are mainly depressions. No scale.

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KAI-YAH-KOO
GREEN LAKE
JAMESVILLE LAKE

Jamesville, N.Y.
O.F. Pfordte-June 4, 1924